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IN THE

Supreme Court of the United States

ATLANTIC RICHFIELD COMPANY, CHEVRON U.S.A., INC., EXXON MOBIL CORPORATION, MOBIL OIL CORPORATION, SHELL OIL PRODUCTS COMPANY, AND TEXACO REFINING AND MARKETING, INC.

Petitioners,

v.

UNION OIL COMPANY OF CALIFORNIA

Respondent.

On Petition For a Writ of Certiorari To the United States Court of Appeals For the Federal Circuit

PETITION FOR A WRIT OF CERTIORARI

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QUESTIONS PRESENTED

1. Whether the Federal Circuit erred in upholding a patent's validity when it did not even acknowledge (a) that the patent application was filed in anticipation of regulatory requirements and would have been valueless if those requirements were not adopted, (b) that all of the claims in the original application were amended (in crucial respects contrary to the teachings of the patent) to resemble those regulatory requirements after they were promulgated, and (c) that the amended claims were not described in the original application but instead were merely among the more than one trillion possibilities encompassed by the patent application?

2. Whether the Federal Circuit erred in upholding a patent's validity when it imposed a limitation on the patent's claims that was not mentioned in the patent, was based on the intended use of the patented product, and was designed to avoid the defense of anticipation by prior art in conflict with this Court's holdings (a) that courts may not "include elements not mentioned in the claim in order to limit such claim and avoid a defense of anticipation," *McCarty v. Lehigh Valley R. Co.*, 160 U.S. 110, 116 (1895), and (b) that "[i]t is not an invention to perceive that the product which others had discovered" could be used in ways not previously perceived, *General Electric Co. v. Jewel Incandescent Lamp Co.*, 326 U.S. 242, 249 (1945)?

PARTIES TO THE PROCEEDING AND RULE 29.6 DISCLOSURE

The following companies, petitioners here and appellants before the United States Court of Appeals for the Federal Circuit, have the parent corporations that own all of the stock in those companies as indicated below:

Atlantic Richfield Company
- BP America Inc.
- BP Amoco PLC

Chevron U.S.A., Inc.
- Chevron Corporation

Exxon Mobil Corporation

Mobil Oil Corporation
- Mobil Corporation
- Exxon Mobil Corporation

Shell Oil Products Company
- Shell Oil Company
- Shell Petroleum
- Royal Dutch Petroleum Company
- Shell Transport and Trading Company, p.l.c.

Texaco Refining and Marketing, Inc.
- Texaco Inc.

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PETITION FOR A WRIT OF CERTIORARI

OPINIONS BELOW

The opinion of the court of appeals (App. 1a-31a) is reported at 208 F.3d 989. The opinions of the district court denying Petitioners' motion for summary judgment (App. 32a-47a) and for judgment as a matter of law (App. 48a-56a) are not reported.

JURISDICTION

The decision of the court of appeals was entered on March 29, 2000. A timely petition for rehearing was denied on May 18, 2000 (App. 57a). This Court's jurisdiction rests on 28 U.S.C. § 1254(1).

STATUTES INVOLVED

Section 102 of Title 35, U.S. Code provides in pertinent part:

> A person shall be entitled to a patent unless—
>
> * * *
>
> (b) the invention was patented or described in a printed publication in this or a foreign country, or in public use or on sale in this country, more than one year prior to the application for patent in the United States, . . .

Section 112 ¶ 1 of Title 35, U.S. Code provides in pertinent part:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly

> connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention . . . .

STATEMENT OF THE CASE

This case has important ramifications for consumers, gasoline refiners, and regulators. The undisputed facts show that Respondent ("Unocal") filed a broad patent application in anticipation of regulations mandating "cleaner" gasolines, amended its patent claims (in crucial respects contrary to the teachings of the patent) to "resemble" those regulatory requirements after they were promulgated, and thereby placed Petitioners ("Refiners") in a regulatory/patent law vise. The Federal Circuit wholly ignored this exploitation of the patent and regulatory processes, while simultaneously uprooting long-settled law under 35 U.S.C. §112 that served as the only bulwark in patent law against this abuse. Its decision also conflicts with two of this Court's decisions by judicially imposing a new limitation on product patent claims that was designed to avoid prior art and by basing that limitation upon the new intended use of an old product.

In 1990, the California Air Resources Board ("CARB") proposed reformulated gasoline ("RFG") regulations designed to reduce automotive emissions. Three months later and without advising CARB, Unocal filed a patent application for "unleaded gasoline fuel[s] suitable for combustion in an automotive engine," with specified properties designed to reduce auto emissions: *decreased* temperatures at which 10%, 50%, and 90% of the gasoline boils away (the "T10," "T50," and "T90" points), vapor pressure ("RVP"), and olefins (one of the three types of gasoline hydrocarbons); *increased* paraffins and aromatics

(the two other types of gasoline hydrocarbons), as well as octane. JA447. Although initially filing 60 claims with combinations of these properties,[1] Unocal's application recited ranges of these properties that potentially encompassed more than one *trillion* possible combinations. JA742-43. Unocal admitted that its application was filed in anticipation of CARB's final regulations. JA379, 564-65. Many of the property ranges simply incorporated existing legal limits, *see* p. 15-16, *infra*, thus positioning Unocal to "mix or match" various properties to correspond with CARB's subsequent requirements.

In November 1991, CARB adopted its final regulations. JA528, 571-72. Unocal then amended all of its claims in a manner which one of the inventors conceded "resembled" CARB's regulations, JA562, and which contradicted the teachings of Unocal's patent application[2]:

• Unocal's patent application identified a *decrease* in T10 to 140° F or preferably 120° F as among the four "most significant" ways to reduce emissions. JA465. However, CARB did not limit T10, and Unocal then amended its claims to *increase* the T10 limit to 158° F – the *maximum* allowed by the preexisting industry standard. JA594-96; JA472.

• The application taught a decrease in olefins to "essentially zero" as "providing the best results possible." JA465. However, CARB adopted an olefin flat limit of 6%, an average limit of 4%, and a cap of 10%. All but one of the

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1 A trial exhibit (JA397) showing Unocal's original claims is reproduced at App. 58a-61a.

2 A trial exhibit (JA472) showing the 41 amended Unocal claims now at issue is reproduced at App. 62a-64a.

amended claims limiting olefins specify the 4%, 6%, or 10% limitation mandated by CARB.

• Unocal's patent application taught that emissions can be reduced by *increasing* aromatics to at least 35%. JA465. However, when CARB instead *limited* aromatics to 25% and imposed no minimum requirements, JA573.2, Unocal dropped the minimum aromatics limitation from its claims.

Had Unocal's claims adhered to the teachings of its patent application, Refiners could have made CARB-compliant gasolines with T10 above the 140° F limits in the original claims, but below the 158° F legal limit, and with olefins above the essentially 0% taught by the patent, but below the 4%, 6%, 10% CARB caps. Evincing the patent-regulatory vise into which Unocal thus placed Refiners by amending its claims to "resemble" CARB, a Unocal representative stated, after the patent was issued and was first made known to CARB and Refiners, "that almost any gasoline that would be practical to make and meet the [CARB] requirements would fall under the scope of our patent." JA473.[3]

Refiners filed this action seeking a declaratory judgment that Unocal's patent is invalid. They promptly moved for summary judgment on the ground that all of Unocal's claims were anticipated by prior unleaded gasolines, including automobile racing gasolines, which met all of the specific property limitations of Unocal's claims

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[3] Unocal's patent as issued on February 22, 1994, contained 224 claims. However, Unocal filed two statutory disclaimers (including one in July 1995, after this action was filed) canceling 183 claims, leaving the 41 now at issue. JA439-42. Moreover, it kept the application alive and obtained four additional patents with more than 800 claims. U.S. Patent Nos. 5,593,567; 5,653,866; 5,837,126; and 6,030,521.

(*e.g.*, RVP, T10, olefins) and were "suitable for combustion in an automotive engine" because they met industry standards for the sale of gasoline to the general public for use in automobiles.

The district court denied the motion, ruling that even though the preamble to Unocal's claims states that they include all "unleaded gasoline fuel, suitable for combustion in an automotive engine," the claims were subject to a further limitation – nowhere found in the patent – *i.e.*, "traditional motor gasoline[s] to be mass-produced at typical refineries for the general motoring public." App. 47a. The district court stated that it imposed this limitation on the claims "specifically to distinguish [Unocal's] fuels from [prior] specialized fuels such as racing and aviation fuels," App. 52a, which would otherwise have invalidated Unocal's patent.

With this "construction" of the patent's claims and the added instruction that fuels which were "merely suitable" for combustion in an automotive engine would not anticipate Unocal's patent, JA774, the jury rejected Refiners' defense that the "invention" was anticipated by prior unleaded racing and aviation gasolines. The jury also rejected Refiners' defense that Unocal's claims lacked the "written description" required by 35 U.S.C. § 112 to establish that Unocal had actually invented the fuels later described in its amended claims when it filed that application in 1990.[4] The jury awarded Unocal a "reasonable" royalty of 5.75 cents for every gallon of infringing gasoline. Refiners' liability for March-July 1996 alone – the first year they were required to sell CARB-compliant gasolines – is $82.9 million. JA6.

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[4] As required by § 112 ¶¶ 1 & 2, Unocal's patent, JA447, consists of a specification and one or more claims. *See Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 373 (1996).

A divided panel of the Federal Circuit (Mayer and Rader, Lourie dissenting) affirmed. The panel majority first upheld the district court's "claim construction" and resultant holding that Unocal's patent was not anticipated by prior art. (Because he would have invalidated the patent under § 112, Judge Lourie did not address this issue.) Although the panel majority agreed that the patent claims "compositions of matter" and that composition claims cannot be limited to "only certain uses of that composition," App. 10a, it nevertheless affirmed the district court's limitation of the patent claims to only those "fuels that will regularly be used in autos."

Like the district court, the panel majority based this limitation on Unocal's purpose of reducing auto emissions by the widespread use of RFG. App. 12a. It accordingly held that prior automobile racing and aviation unleaded gasolines were not the same compositions as the "standard automotive" gasolines "invented" by Unocal. In holding that these prior art fuels did not anticipate Unocal's "invention," the panel majority did not discuss the uncontested evidence that these unleaded gasoline fuels satisfied all the specific property limitations of the claims and were "suitable for combustion in an automotive engine."

The panel majority also rejected Refiners' argument that Unocal's original patent application failed to comply with 35 U.S.C. § 112, even though it agreed that the application must "clearly allow persons of ordinary skill in the art to recognize that [the applicant] invented what is [later] claimed." App. 13a (citation omitted). In holding that Unocal's patent satisfied this standard, the panel majority refused to apply *In re Ruschig*, 379 F.2d 990 (CCPA 1967) (and its progeny, *see* p. 17, n.9, *infra*), which held that a later-added claim to a specific chemical composition was not sufficiently described in the original application when it was only one of the half-million combinations potentially encompassed by the original patent application.

First, the panel majority held that *Ruschig* "involved a copied claim," so that "it is not surprising that the disputed claim did not find support in Ruschig's specification . . . ." App. 20a. In so holding, the panel majority ignored Refiners' argument that *Ruschig* applies *a fortiori* here because Unocal's claims were concededly amended to "*resemble*" CARB's regulations.

Next, the panel majority held that it is proper to "narrow" claims during prosecution and that § 112 questions "should be dealt with on a case-by-case basis." App. 21a. Again, the panel majority ignored Refiners' argument that Unocal *broadened* its claims – raising T10 to the 158° F legal limit and abandoning an aromatics limitation – after CARB issued its regulations, and that this is the *worst case* example of a § 112 violation because it involves the amendment of patent claims tailored to regulatory requirements.

Finally, the panel majority acknowledged that *Ruschig* requires that the patent application must provide "blaze marks" to newly added or amended claims when they are merely part of a "forest of trees" described generally in an application. App. 21a. However, it concluded that Unocal had provided sufficient "blaze marks." In so holding, the panel majority ignored Refiners' argument that here there were one trillion – a world, not a forest – of potential claims and that it was CARB, not Unocal, who provided the "blazemarks" to the amended claims. In fact, neither this nor any other part of the opinion even mentions CARB or its regulations.

Judge Lourie dissented, concluding that Unocal's claims were invalid for lack of a written description, even without regard to Unocal's exploitation of the CARB regulatory process. The dissent noted that the patent contains only general descriptions of how to make fuel compositions, but does not describe any of the ultimately claimed

compositions: "It is in fact undisputed that the specification discloses no distinct embodiments corresponding to *any* claim at issue." App. 24a (emphasis added). Continuing, he stated (App. 27a):

> The simple direction to adjust more than one fuel characteristic at a time does not direct one to, and thus does not show possession of, any of the claimed combinations of fuel characteristics. One must pick and choose among eight different types of fuel characteristics, broadly described, in order to arrive at any of the claimed combinations.

Judge Lourie, therefore, concluded that Unocal's written description failed to meet the "full, clear, concise, and exact" language requirement of § 112 ¶ 1. App. 27a.

Refiners petitioned for rehearing and rehearing en banc, and the State of California and CARB filed an amicus brief urging the Federal Circuit to decide the "important public policy question: whether the courts of the United States should allow companies to use patent laws to distort government administrative processes." Calif. Amicus Br. 2. *See also*, *id.* at 6, noting that "[t]he actual monetary value of the [Unocal] patent stems mostly from the fact that it covers activities required by [CARB's] regulations," and that Unocal used the CARB administrative process "to create an anti-competitive grasp on the market." The Federal Circuit denied the petition without even asking Unocal to respond to Refiners' and California's submissions.

REASONS FOR GRANTING THE WRIT

I. THIS CASE PRESENTS ISSUES OF EXCEPTIONAL IMPORTANCE

This case has significant ramifications that extend to all refiners of gasoline in California, the consumers who purchase their gasolines, and more recently to the rest of the Nation as well. Unocal's economic expert at trial documented the impact that its 5.75 cent per gallon royalty could have on consumers: He assumed that the Refiners would pass on 90% of this royalty, Tr. 5669, and in his "expert opinion" consumers "ought to be happy to pay 4 or 5 cents . . . of this royalty to Unocal to help fund these payments," Tr. 5670.

The Environmental Protection Agency has recently imposed federal auto emission standards under the Clean Air Act, effective June 30, 2000, which require Refiners and others to lower RVP and take other actions that Unocal will doubtless argue infringes Unocal's patents.[5] Consequently, Unocal not only obtained a patent on California regulatory standards, but also it can now try to exploit federal regulatory requirements. The Federal Trade Commission has recently reported large increases in gasoline prices (especially in the Midwest) where new RFG requirements have been imposed. The FTC specifically noted that the Federal Circuit's decision

> upholding Unocal's patent for some formulations of RFG may have caused some refineries to change RFG blends in an apparent effort to avoid infringement or high

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[5] *See* p. 4, n.3, *supra*, referring to the four additional patents with 800 claims that Unocal has subsequently derived from the patent application at issue here.

> royalty payments, leading to production delays and decreased refinery throughput.

Midwest Gasoline Prices, Presented by FTC Chairman Robert Pitofsky, Before the Committee on Commerce, U.S. House of Representatives (June 28, 2000), available at www.FTC.gov/OS/2000/06/gasolinecommerce.htm. *See also Summer Energy Concerns For The American Consumer:* Hearings Before Committee on Commerce, U.S. House of Representatives, (June 28, 2000), available at www.house.gov/commerce/ (CITGO testimony that Unocal's patents caused it to reduce production of new EPA-required gasolines from 15,000 to 4,000 barrels per day).

The Federal Circuit completely ignored the regulatory context in which this case arises. That omission might be tolerable if the patent laws provided federal courts with no tools to deal with "inventors" who file broadly worded patent applications in anticipation of regulations and then amend their claims to resemble those regulations after they are issued. However, under long-established caselaw, the written description requirement of § 112 could have prevented the kind of manipulation of the patent and regulatory processes that occurred in this case. But rather than apply § 112 for that purpose, the Federal Circuit warped and distorted § 112, effectively disabling federal courts in patent cases from addressing this kind of abuse.

Moreover, the Federal Circuit embraced an approach to claim construction – *i.e.*, that an unstated limitation can be judicially read into Unocal's claims based on the intended use of Unocal's "invented" fuels to avoid prior art that otherwise would have invalidated the patent – which defies two of this Court's long-standing patent law decisions and oversteps the authority given to the Federal Circuit by this Court's 1996 decision in *Markman*.

Thus, this case presents a confluence of important questions of patent law that will certainly affect millions of

automobile drivers in California if Refiners are forced to pay a 5.75 cent per gallon royalty to Unocal, may well affect many millions more throughout the rest of the Nation, and unquestionably rewards – and thereby invites – misuse of the patent system.

II. THE FEDERAL CIRCUIT'S INTERPRETATION OF THE WRITTEN DESCRIPTION REQUIREMENT IGNORES THE REGULATORY CONTEXT OF THIS CASE AND UPROOTS THE LONG-STANDING DOCTRINE THAT CAN PROTECT AGAINST ABUSE OF THE PATENT/ REGULATORY PROCESSES

A. The Written Description Requirement Ensures That The Inventor Has Actually Invented What Is Later Claimed

The written description requirement of the patent laws has existed since the original 1793 Patent Act. *See In re Barker*, 559 F.2d 588, 592 (CCPA 1977). As the Court recognized nearly 200 years ago, this statutory requirement was designed, *inter alia*, to protect the public from the inventor "'pretending that his invention is more than what it really is, or different from its ostensible objects.'" *Id.* at 592 n.4 (quoting *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 434 (1822)). *Cf. Muncie Gear Works, Inc. v. Outboard, Marine & Mfg. Co.*, 315 U.S. 759, 768 (1942) (added claims invalid because not entitled to filing date of original application as prohibited "new matter" under 35 U.S.C. § 132, where the original application "wholly failed to disclose the invention now asserted").

To guard against this abuse of the patent system, 35 U.S.C. § 112 provides that "[t]he specification shall contain a written description of the invention," which courts have long interpreted as requiring a "description [that] must be

sufficiently clear that persons of skill in the art will recognize that the applicant made the invention." *Martin v. Mayer*, 823 F.2d 500, 505 (Fed. Cir. 1987). Consequently, it is not sufficient that a patent application enables a person to practice the invention.[6] Rather, the *original* application must show that the inventor was *then* "'in possession' of the invention by describing the invention, with *all* its claimed limitations . . . ." *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997) (emphasis added).

Thus, the requirement of written description "guards against the inventor's overreaching":

> Satisfaction of the description requirement insures that subject matter presented in the form of a claim *subsequent to the filing date of the application* was sufficiently disclosed at the time of filing so that the prima facie date of invention can fairly be held to be the filing date of the application.

Vas-Cath, Inc., 935 F.2d at 1561-1562 (internal quotations omitted) (emphasis added). *See also Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998) ("patent specification 'must clearly allow persons of ordinary skill in the art to recognize that [applicant] invented what is claimed'" (quoting *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir. 1989)).

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[6] *See Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991) ("The purpose of the 'written description' requirement is broader than to merely explain how to 'make and use' [the invention]; the applicant must also convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention."); 3 Donald S. Chisum, CHISUM ON PATENTS § 7.04 (2000) ("Claims can be . . . barred by the description requirement even though the original specification adequately teaches how to make and use the subject matter of the claims.").

B. The Federal Circuit Erred By Ignoring The Interaction Of The Regulatory And Patent Processes

This case at its core involves the intersection of patent and regulatory law – a point that Refiners repeatedly emphasized in their briefs and at oral argument, but the Federal Circuit ignored. Unocal has never claimed that the adjustments of the properties identified in its patent were intended to satisfy consumer demands or make gasoline cheaper. To the contrary, CARB estimated Refiners would have to invest $7 *billion* to modify their refineries to meet CARB requirements, Tr. 766. In these circumstances, the imposition of regulatory requirements was essential for large-scale manufacture and sale of the gasolines claimed in Unocal's patent. Unsurprisingly, Unocal conceded at trial that it had never commercially produced low-emission gasoline until CARB required it to do so. Tr. 528.

Moreover, because the adjustment of the various properties identified in the Unocal patent for reducing auto emissions comes at a financial cost, no "inventor" could determine the appropriate balance between the additional costs associated with these adjustments and the increased benefits to society associated with lowering emissions. Only regulators – here, CARB or EPA – can weigh such costs and benefits to determine the "right" balance.[7] However, Unocal

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[7] *See* S. Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* 10 (1993):

> [T]he risk manager will consider what will be likely in fact to occur should he choose each of several regulatory options . . . . To what extent will the regulation deprive users of benefits the substance now brings? To what extent will it impose added costs? . . . Ultimately, in light of the identified risks, the risks associated with alternatives, the effect on benefits, the costs, and

(...continued)

did not reveal to CARB, EPA, or anyone else the existence of its patent application. Instead, Unocal participated with the rest of the oil industry in CARB's decision-making process, waited for CARB to make its regulatory decisions, and then scrapped all of the original claims and substituted amended claims to "resemble" the CARB regulations.

The Federal Circuit completely ignored the relationship between Unocal's patent and the regulatory process. The words "CARB," "regulation" or their synonyms do not appear anywhere in the court's opinion, even though Refiners repeatedly argued that Unocal had *a fortiori* violated the § 112 requirement of a "full, clear, concise, and exact" written description by virtue of its exploitation of the CARB regulatory process.

A Second Circuit decision, handed down after the one at issue here, starkly highlights the Federal Circuit's disregard of the regulatory aspects of this case. In *SmithKline Beecham Consumer Healthcare, L.P. v. Watson Pharmaceuticals, Inc.*, 211 F.3d 21, 29 (2d Cir. 2000), *cert. pending*, No. 00-19, the court held that the "purpose of the copyright laws – to encourage the production of creative works by according authors a property right in their works so that authors will not have to share profits from their labors with free riders – is not seriously implicated" when the materials were generated to meet an FDA regulatory requirement and the copyright holder registered them shortly before the FDA approved the marketing of a competitor's products. Thus, in *SmithKline*, the Second Circuit found that the correspondence of the copyrighted materials to a statutorily mandated regulatory standard resulted in the loss of the copyright holder's intellectual property rights. *Id.*

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the practicalities, the risk managing regulator will reach a decision.

In this case, the Federal Circuit ignored clear, abundant, and undisputed evidence of Unocal's gaming of the regulatory and patent processes:

- Unocal's original application was filed in anticipation of regulatory requirements that would later be imposed by CARB and set forth long lists of gasoline properties that in many respects simply corresponded to then-existing legal requirements – *e.g.*, all RVPs below 8.0, JA465, when CARB's then-applicable interim regulations limited RVP to 7.8, JA5782;[8] all olefins below 15%, the legal limit, JA588.

- These property values can be combined in more than one *trillion* ways.

- After CARB issued its final regulations in November 1991, Unocal admittedly amended all of its claims to "resemble" CARB's requirements.

- Those amendments contradicted the teachings of Unocal's patent application – *e.g.*, the maximum T10 taught and originally claimed by the patent was 140° F, but when CARB failed to limit T10, Unocal amended its claims to include gasolines with T10s of up to 158° F – the legal limit for T10. When CARB did not require the 0% or near 0% olefins taught by Unocal's patent application, Unocal amended its claims to track CARB's 4%, 6%, 10% requirements. And when CARB decided not to require aromatics, Unocal dropped its corresponding requirement.

- If Unocal had stuck with the teachings of its patent application without amending its claims to "resemble" CARB, Refiners could have made CARB-compliant

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[8] 38 of Unocal's 60 original claims set RVP at ≤ 8.0° F. App. 58a-61a.

gasolines with T10s above the 140° F limit in the original application, but below the 158° F legal limit, and with olefins above the near 0% limitations, but below the CARB caps.

• Unocal's intention in amending its claims was clearly revealed by a spokesperson who was quoted as announcing after the patent issued "that almost any gasoline that would be practical to make and meet the [CARB] requirements would fall under the scope of our patent." JA473.

Had the Federal Circuit acknowledged *any* of these clear instances of regulatory gaming of the patent process, it would have been forced to conclude that the written description was inadequate under § 112.

Indeed, as Judge Lourie clearly showed in his dissent, had the court applied the proper § 112 standard without regard to the regulatory dimensions of this case, "[a] reasonable juror could not find that the application shows possession of those [claimed] combinations . . . by blazing a clear trail to them." App. 27a.

C. The Federal Circuit's Decision Renders Federal Courts Powerless To Prevent Future Patent-Regulatory Gaming

The Federal Circuit's disregard of the regulatory dimensions of this case is reason enough for this Court to grant certiorari. But even greater harm will result from its evisceration of the long-standing doctrine under § 112 that stood as the only bulwark against gaming of the regulatory and patent regimes. Ironically declaring that it would not let "form triumph over substance," App. 21a (internal citation and quotation omitted), the panel majority effectively removed from the patent laws the time-honored principle that an applicant must show at the time of the original filing of the patent application that he or she had actually invented what is later claimed after amendments to the patent.

The Court of Customs and Patent Appeals ("CCPA"), the predecessor to the Federal Circuit, explained that the written description requirement was like a trail in a forest in cases like this one, when amended claims simply fall within the myriad claims potentially contemplated by a patent application:

> It is an old custom in the woods to mark trails by making blaze marks on the trees. It is no help in finding a trail or in finding one's way through the woods where the trails have disappeared – or have not yet been made, which is more like the case here – to be confronted simply by a large number of unmarked trees. Appellants are pointing to trees. We are looking for blaze marks which single out particular trees. We see none.

In re Ruschig, 379 F.2d at 994-95.

In *Ruschig*, the patent specification disclosed three variables for chemical compositions, and the court noted that, "[i]f the proper choices of the three variables in the ... formula are made, the compound in question is produced, *but nowhere in the specification is the particular selection indicated.*" 379 F.2d at 993 (emphasis added). The CCPA held that "the general disclosure of the application encompasses something like half a million possible compounds," and accordingly found that the claim was invalid for lack of a written description. *Id.*

Ruschig and its progeny apply *a fortiori* here.[9] Instead of the half-million potential combinations of three

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[9] *See, e.g., Fujikawa* v. *Wattanasin*, 93 F.3d 1559, 1571 (Fed. Cir. 1996) (condemning "laundry list" patent applications and holding that "simply describing a large genus of compounds is not sufficient to satisfy (...continued)

variables in *Ruschig*, Unocal's application encompassed more than *one trillion* combinations of eight variables. Moreover, Unocal's claims were admittedly amended to "resemble" CARB's requirements and, accordingly, those claims in important respects contradict the "blazemarks" of the patent – *e.g.*, T10 went up, not down.

Instead of applying *Ruschig* and its progeny – the panel majority purported to distinguish those cases by limiting them to cases where claims are copied, while ignoring Unocal's testimony that it had amended its claims to "*resemble*" CARB's regulations, and by holding that claims can be narrowed during prosecution, again ignoring that many of Unocal's claims were *broadened* to resemble CARB's regulations – *i.e.*, when maximum T10 was raised to 158° F and the aromatics limitation was abandoned. The Federal Circuit's decision in this case has effectively nullified § 112 as a device for dealing with abuses at the intersection of the patent and regulatory processes.

Given the Federal Circuit's lack of concern with this issue, evident in its failure even to ask Unocal on rehearing to respond to Refiners' and California's arguments highlighting Unocal's manipulation of the patent and regulatory systems, action by this Court is required to preserve the patent law tools for limiting this abuse made available by § 112.

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the written description requirement as to particular species or sub-genuses"); *Rohm & Haas Co.* v. *Mobil Oil Corp.*, 718 F. Supp. 274, 310 (D. Del. 1989) (application disclosing a broad genus encompassing billions of compounds did not support later-added claims to sub-genera, where "there was no direction or guidance for the subgenera now claimed"), *aff'd mem.*, 895 F.2d 1421 (Fed. Cir. 1990); *Hercules Inc.* v. *Exxon Corp.*, 497 F. Supp. 661, 683 (D. Del. 1980) (patent that encompasses "perhaps a million or more" potential compounds, without specifying those set forth in the patent's amended claims, invalid under § 112).

III. THE FEDERAL CIRCUIT'S HOLDING THAT THE UNOCAL PATENT WAS NOT ANTICIPATED BY PRIOR ART CONFLICTS WITH THIS COURT'S DECISIONS

Unocal's actions discussed above would be bad enough if it had patented a new product, even though "invented" in large part by CARB. They are even worse when Unocal's patent is understood for what it is – the improper patenting of an old product that escaped invalidity when Unocal persuaded the courts to create a limitation on the claims that is nowhere mentioned in the patent and is based on the intended use of the product.

An invention is not patentable unless it is "new." 35 U.S.C. § 101. "Th[is] novelty requirement lies at the heart of the patent system." 1 CHISUM § 3.01, at 3-3. To protect an invention that is not in fact novel from competition would only serve to grant the inventor monopoly rents with no corresponding benefit to society. "It is as important to the public that competition should not be repressed by worthless patents, as that the patentee of a really valuable invention should be protected in his monopoly ...." *Pope Manufacturing Co. v. Gormully*, 144 U.S. 224, 234 (1892).

The patent laws therefore provide that an inventor may not obtain a patent for an invention that is "anticipated," *i.e.*, that is completely taught in the "prior art." *See* 35 U.S.C. § 102. A "composition of matter" patent is anticipated when its claim limitations are found in an another composition that was made, sold or described in a printed publication more than one year prior to the filing of the patent holder's application. *Id.* § 102(b). That is *exactly* what happened here. *Compare* Unocal claim 71, "an unleaded gasoline suitable for combustion in an automotive engine" with RVP up to 7.0, T50 up to 205° F, olefins below 10%, octane at least 92 (App. 62a), *with* Phillips Unleaded Racing Gasoline which satisfied industry standards and was

"suitable for combustion in an automotive engine" with RVP 6.5 (below 7.0), T50 204° F (below 205° F), olefins 0% (below 10%), octane 97 (above 92); JA553-55.

This Court has expressly instructed lower courts *not* to read additional limitations into patent claims to avoid prior art that anticipates the patent:

> [W]e know of no principle of law which would authorize us to read into a claim an element which is not present, for the purpose of making out a case of novelty or infringement. The difficulty is that, if we once begin to include elements not mentioned in the claim in order to limit such claim and avoid a defence of anticipation, we should never know where to stop.

McCarty, 160 U.S. at 116. Notwithstanding this admonition, the Federal Circuit rejected Refiners' anticipation defense by adding, under the guise of claim construction, a limitation not mentioned in Unocal's claims or anywhere else in its patent. App. 12a.

Moreover, this new limitation was based on the Federal Circuit's perception of Unocal's new intended widespread use of the fuels which it claimed to have invented – *i.e.*, to address the smog problem. App. 11a. Thus, the Federal Circuit's decision also conflicts with *General Electric Co.*, 326 U.S. at 248, which held that "[i]t is not an invention to perceive that the product which others had discovered had qualities they failed to detect." *See also Ansonia Brass & Copper Co. v. Electrical Supply Co.*, 144 U.S. 11, 19 (1892) ("'a mere carrying forward, or new or more extended application of the original thought . . . is not such [an] invention as will sustain a patent.'" (quoting *Smith v. Nichols*, 88 U.S. (21 Wall.) 112, 119 (1874)); 1 CHISUM § 3.02[3] ("anticipation is not avoided by the discovery of a

new use, property, or advantage of an old product or process").

A. The Federal Circuit Contravened This Court's Decisions By Rewriting Unocal's Patent Claims

The panel majority correctly recognized that each of the claims of Unocal's patent begins with the preamble, "[a]n unleaded gasoline fuel suitable for combustion in an [or 'a spark ignition'] automotive engine," App. 2a-3a, and that the claims then "specify the chemical properties of the gasolines," App. 3a. As Judge Lourie recognized, "[w]e only have claims defining compositions by *a specific set of claim limitations*." App. 29a (emphasis added).

Moreover, the panel majority did not dispute (i) that the specific property limitations of its claims are found in prior unleaded racing gasolines and aviation fuels (*e.g.*, JA750-51);[10] (ii) that these prior art fuels are "unleaded gasolines" within the definitions provided by the patent (JA460-61); and (iii) that all of the prior art unleaded gasolines relied upon by Refiners are "suitable for combustion in an automotive engine" because they satisfy the American Society for Testing and Materials ("ASTM") Standard Specification for Automotive Spark-Ignition Engine Fuel (JA5933). In fact, prior to its patent application, Unocal marketed its own unleaded racing gasoline by advertising to the general public that it:

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10 *E.g.*, Phillips Unleaded Racing Gasoline. *See* p. 19-20, *supra*. The panel majority's statement that, while "some properties of . . . racing fuels coincide with the properties of the '393 patent's claims, the record does not show the presence of each and every limitation," App. 12a, is *not* based upon the specific property limitations recited in the claims. Instead, it is based solely on the "traditional" or "standard motor gasoline" limitation imposed by the courts in this case.

> meets all federal . . . standards for automotive gasolines . . . [and] is ideal for all . . . street vehicles requiring Unleaded gasolines . . . . Hundreds of Unocal service stations nationwide now offer this product for sale to the public.

JA330.1-330.2; *see also* JA446 ("[m]arketed alongside our High Performance 92 . . ., Unocal 100 . . . racing gasoline is the natural extension of our product line.")

Although the claims' preamble broadly includes *all* "unleaded gasoline fuel suitable for combustion in an automotive engine," the district court instructed the jury that a prior art gasoline – like unleaded racing gasoline – which *is* "suitable" for combustion in an automotive engine would not anticipate Unocal's claims. JA774. Instead, contrary to *McCarty*, the district court instructed the jury that the patent covers "only unleaded gasoline fuels intended for regular use in automobiles. That is *traditional* motor gasoline to be mass produced at typical refineries for the general motoring public." JA773 (emphasis added). The district court acknowledged that its "intended use" limitation "identified traditional motor fuels for the general motoring public *specifically to distinguish* these fuels from specialized fuels such as racing and aviation fuels." App. 52a. (emphasis added).

The terms "traditional motor gasoline" (the district court's limitation) or "standard automotive gasoline" (the Federal Circuit's) cannot be found *anywhere* in the patent. Indeed, the patent clearly teaches that the claims were not limited to gasolines intended for widespread public use. Only "[t]he most preferred" – not all – of the invented gasolines satisfy the ASTM industry standard, JA461, for sale to the public, JA594. Plainly, gasolines that cannot even be sold to the public are not limited to "traditional" or "standard" gasolines.

B. The Federal Circuit Disregarded The Decisions Of This Court By Adding A New Limitation To Unocal's Patent Claims Based On The Intended Use of Unocal's Fuels.

The Federal Circuit recognized that the district court had construed the claims as being limited to "fuels that will *regularly* be used in autos," App. 10a, without even pausing to note that this was merely a statement of intended use. It then asserted, without explanation or record support, that "[t]he district court thus construed the claims to cover only a narrow class of *fuel compositions*, namely only standard automotive gasoline" and "excluded from claim scope a broader class of *petroleum formulations* such as aviation fuels or racing fuels." *Id.* (emphasis added). In this fashion, the Federal Circuit added its own undefined limitation – "standard automobile fuel" which it derived from its and the district court's perception of the intended use of Unocal's fuels.[11]

The Federal Circuit's assertion that "[t]he district court's interpretation also finds extensive support in the specification," App. 11a, also demonstrates its departure from *General Electric*'s proscription of patenting a

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[11] The district court failed to give the jury *any* guidance as to how it could distinguish the invented "fuel compositions" from prior art "petroleum formulations" and conceded that "no one has defined the phrase traditional motor fuel." JA659.1. The panel majority similarly did not identify the purportedly "narrow class of fuel compositions" of "standard automobile gasoline[s]" that will "*regularly* be used in autos," except to distinguish them from Refiners' prior art "aviation fuels or racing fuels." App. 10a. Certainly, the panel majority's observation that "[t]he claim language specifies fuels for an 'automotive engine' not an aviation engine," App. 10a-11a, cannot rationally exclude unleaded racing gasoline fuels that are used *solely in automotive engines*.

composition based upon its potentially new intended use. The Federal Circuit's imposition of a "standard automobile fuels" limitation was avowedly based on the "problem that [the] invention addressed . . . (i.e., 'smog')" caused by a "great number of automobiles." *Id.* Clearly, the Federal Circuit relied on the inventors' intention regarding the widespread *use* of their product to impose a new limitation narrower than the one found in the claims themselves: Prior unleaded gasolines that were "suitable for combustion in an automotive engine," like unleaded racing gasolines, were excluded solely because they were not the "traditional" or "standard" fuels widely used by the general public and thus would not be intended for use to solve the "smog problem."

In upholding a patent for compositions of matter by relying on their intended use to impose a limitation which was expressly designed to avoid prior art, the Federal Circuit's decision is flatly inconsistent with this Court's holdings in both *General Electric* and *McCarty*. Standing alone, this departure from this Court's precedents justifies grant of Refiners' petition. In the context of the Federal Circuit's refusal to invalidate a patent with the broad implications of the one here, the court of appeals' departure from those precedents presents a compelling justification for this Court's review of the Federal Circuit's decision.

C. The Federal Circuit's Misuse of the Claim Construction Authority Granted By This Court In *Markman* Provides Further Support For Granting The Petition.

Just four years ago, this Court held that the Federal Circuit's exclusive patent jurisdiction included *de novo* construction of claims as an issue of law because of the importance of claim certainty:

> "[T]he limits of a patent must be known for the protection of the patentee, the

> encouragement of the inventive genius of others and the assurance that the subject of the patent will be dedicated ultimately to the public." Otherwise, a "zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure of the field . . . ." "The public [would] be deprived of rights supposed to belong to it, without being clearly told what it is that limits these rights."

Markman, 517 U.S. at 390 (internal citations omitted).

The Federal Circuit's decision in this case creates the very uncertainty that *Markman* condemns. Under the guise of claim construction, the Federal Circuit rewrote Unocal's claims to impose an additional limitation not found in the claims as they were issued by the Patent and Trademark Office ("PTO") and thereby affirmed a district court decision which acknowledged that it added a narrowing limitation specifically to save the claims from the prior art. JA149.

In taking this action, the Federal Circuit not only overstepped its claim construction authority, but also it usurped the statutory authority given *exclusively* to the PTO to do what the courts did here – narrow patent claims to avoid invalidity. A patentee is not entitled to a patent narrowing claims to avoid prior art unless it pursues the process and satisfies the requirements for reissued patents imposed by 35 U.S.C. § 251. Moreover, by allowing Unocal to circumvent the reissue procedure, the Federal Circuit subjected Refiners and others to infringement liability without the protections provided by the intervening rights provisions of 35 U.S.C. § 252.

Given the significance of this case and the implications of the Federal Circuit's decision, this is a perfect opportunity for the Court to clarify and delineate the role of

the courts in construing claims as opposed to the statutory role of the PTO to narrow claims by reissue. By granting the petition and ultimately reversing the decision below, this Court would send a clear message that *Markman* is not a license for judicial revision of patent claims, but instead that claim construction is a process of interpreting *existing* claim limitations.

CONCLUSION

The penultimate sentence of Justice Jackson's unanimous opinion for the Court in *Muncie Gear*, 315 U.S. at 768, provides a fitting conclusion for the petition:

> To sustain the claims in question upon the established and admitted facts would require a plain disregard of the public interest sought to be safeguarded by the patent statutes, and so frequently present but so seldom adequately represented in patent litigation.

The petition should be granted.

Respectfully submitted,

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UNITED STATES COURT OF APPEALS,

FEDERAL CIRCUIT

UNION OIL COMPANY OF CALIFORNIA,

Plaintiff-Appellee,

v.

ATLANTIC RICHFIELD COMPANY,
CHEVRON U.S.A. INC.,
EXXON CORPORATION,
MOBIL OIL CORPORATION,
SHELL OIL PRODUCTS COMPANY and
TEXAS REFINING AND MARKETING, INC.,

Defendants-Appellants

No. 99-1066

March 29, 2000

Before MAYER, [Chief] Judge, LOURIE and RADER, Circuit Judges.

Opinion for the court filed by Circuit Judge RADER. Circuit Judge LOURIE dissents in part.

RADER, Circuit Judge.

The United States District Court for the Central District of California denied the appellants' motion for Judgment as a Matter of Law (JMOL) which sought to overturn the jury verdicts of patent validity and willful infringement. *See Union Oil Co. of Cal. v. Atlantic Richfield Co.*, No. CV-95-2379-KMW, slip op. at 1 (C.D. Cal. Mar. 10, 1998) (*Unocal I*). In their JMOL motion, the Atlantic Richfield Company and other appellant refiners asserted that Union Oil Company

of California's (Unocal) United States Patent No. 5,288,393 ('393 patent) is invalid under 35 U.S.C. §§ 102 and 112 (1994). The district court also held that Unocal did not commit inequitable conduct before the U.S. Patent and Trademark Office (PTO). *See Union Oil Co. of Cal. v. Atlantic Richfield Co.*, 34 F.Supp.2d 1208, 1222 (C.D.Cal.1998) (*Unocal II*). Because the appellant refiners did not show a reversible flaw in the jury's verdict, this court affirms the district court's denial of JMOL on §§ 102 and 112 issues. Similarly, this court affirms the trial court's discretionary judgment of no inequitable conduct.[1]

I.

Unocal owns the '393 patent, which claims automotive gasoline compositions that reduce automobile tailpipe emissions. Unocal's original patent application contained 82 claims. As is often the case during the course of prosecution, the inventor added and canceled many claims. Ultimately, 155 claims issued, but Unocal later disclaimed all but the forty-one at issue in this case: claims 20, 53, 54, 56, 57, 71-75, 78, 79, 81, 112-16, 117 (multiply dependent on claims 53, 73, 78, 112, 116. and 125), claim 120 (multiply dependent on claims 55, 78, 79, and 124), claim 121 (dependent on claim 120 and therefore multiply dependent on claims 55, 78, 79 or 124), 125-27, 133-35, 137, 153, and 155. Each claim appears in dependent or multiple dependent form, and has from four to six limitations describing ranges for several of the fuel characteristics. Each claim effectively begins either with the preface "[a]n unleaded gasoline fuel suitable for combustion in an automotive engine" or "[a]n unleaded gasoline fuel suitable for combustion in a spark

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[1] Because the appellant refiners did not question the district court's willfulness determination in their appeal, this court does not address that issue.

ignition automotive engine." As an example, Claim 117, as dependent upon claim 116, states:[2]

> 117. [An unleaded gasoline fuel suitable for combustion in an automotive engine, said fuel having a Reid Vapor pressure no greater than 7.0 psi, and a 50% D-86 distillation point no greater than 200° F., and a 90% D-86 distillation point no greater than 300° F., and a paraffin content greater than 85 volume percent, and an olefin content less than 4 volume percent] wherein the maximum 10% distillation point is 158° F (70° C.).

'393 patent, col. 24, ll. 24-27.

As illustrated above, the claims do not describe each gasoline product in terms of molecular structures or lists of ingredients. Instead, the claims specify the chemical properties of the gasolines, reflecting the way oil refiners formulate gasoline. When oil refiners formulate new gasoline products, they do so by mixing petroleum stocks. Different stocks have different properties that are known to oil refiners. The record shows that oil refiners of ordinary skill in the art change the chemical properties of gasoline by varying the proportions of different petroleum stocks. Thus the claims which define the invention in terms of various characteristics also inform those of skill in the art of the composition of the claimed gasoline fuels.

Unocal researched extensively the production of automotive gasoline with reduced combustion emissions. Unocal's scientists, Drs. Jessup and Croudace, ultimately

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[2] Because the claims are written in multiple dependent form, the claim elements that are incorporated from other claims have been paraphrased in brackets.

filed a patent application based on their findings. Their research taught ways to produce cleaner gasoline by varying the following chemical properties in automotive gasolines: Reid Vapor Pressure (RVP), T10, T50, T90, Olefins, Paraffins, Aromatics,[3] and Octane.

RVP measures the partial pressure of a gasoline sample when heated to 100° F in a sealed container. *See id.* at col. 18, ll. 43-47. T10, T50 and T90 are abbreviations for percentage distillation points, as measured according to an industry standard procedure called "D-86." Each corresponds to the temperatures at which a given percentage of the gasoline sample enters a gaseous phase under specific experimental conditions. Thus, T10 is the 10% D-86 distillation point; T50 the 50% D-86 distillation point; and T90 the 90% D-86 distillation point. The olefins value describes the percentage of the gasoline comprised of olefins measured by volume. Olefins, otherwise known as alkenes, are open-chain hydrocarbons that contain at least one double bond. The paraffins value describes the percentage of the gasoline comprised of paraffins measured by volume. Paraffins, otherwise known as alkanes, are open-chain hydrocarbons that contain only single bonds. The aromatics value describes the percentage of the gasoline comprised of aromatics measured by volume. Aromatics, are compounds whose properties resemble those of 6-carbon ring molecules that have an average of three intra-ring carbon-carbon double bonds (i.e., benzene). Octane, as used in the '393 patent, describes the knocking or detonation characteristics of a gasoline sample as compared with a reference fuel. The octane value is derived by testing gasoline in a special engine

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[3] Although the '393 patent teaches increasing the aromatic content of automotive gasoline to reduce tailpipe emissions, the claims do not mention aromatic content.

under specified experimental conditions, and comparing those results to identically tested reference blends of Isooctane and n-heptane.

Drs. Jessup and Croudace sought to reduce the levels of carbon monoxide (CO), nitrous oxide (NO_x), and hydrocarbons (HC) emitted from automobile tailpipes. After considerable experimentation, Drs. Jessup and Croudace discovered relationships between the various petroleum characteristics described above and tailpipe emissions. Drs. Jessup and Croudace then patented their innovative fuel compositions, describing the new compositions by their characteristics.

The specification of the '393 patent describes relationships among automotive gasoline characteristics and fuel emissions, including the following:

1. Decreasing RVP is of primary importance, and decreasing T10 and olefin content are of secondary importance for reducing NO_x emissions. *See* '393 patent, col. 2, ll. 21-29.

2. Decreasing T50 is of primary importance for reducing CO and HC emissions. *See id.* at ll. 7-11.

3. Increasing paraffin content and decreasing T50 are most effective for reducing CO emissions. *See id.* at col. 6, ll. 12-28.

4. Decreasing both olefin content and RVP are most effective for reducing NO_x emissions. *See id.* at ll. 28-31.

5. HC emissions are most practically reduced by decreasing olefins and/or T50. *See id.* at ll. 46-50.

6. Any combination of the eight characteristics can be increased or decreased as described, and that the greater any individual characteristic is changed in the directions indicated, the better the result. *See id.* at col. 15, ll. 20-28.

The specification also provides specific numerical ranges for each characteristic. For example, the specification teaches:

1. CO and HC emissions can be minimized by reducing T50 below 215° F, preferably below 195° F. *See id.* at col. 2, ll. 7-20.

2. NO_x emissions can be minimized by (a) decreasing RVP to 8.0 psi or less (preferably below 7.0 psi); (b) decreasing olefins below 15% (preferably to essentially zero); or (c) decreasing T10 below 140° F. *See id.* at ll. 21-34.

3. The best NO_x reductions are obtained when the olefins are below 15%, RVP is 7.5 psi or less, and T10 is below 140° F. *See id.* at ll. 44-50.

4. All three pollutants are reduced when T50 is 215° F or less and RVP is 8.0 psi or less, with greater reductions when olefins are below 10% or T10 is below 140° F, and still greater reductions when both olefins and T10 are reduced. *See id.* at ll. 54-64.

5. Further pollution reductions are possible when T50 is below 195° F, olefins are below 5% (preferably at essentially zero), T10 is below 120° F, and/or when RVP is below 7.0 psi. *See id.* at l. 64--col. 3, l. 3.

Elsewhere the specification describes the optimal ranges for five of the eight fuel characteristics in similar terms.

The specification also states that the gasolines are preferably unleaded, have an octane rating of at least 90, and fall most preferably within one or more of five volatility classes in American Society for Testing and Materials (ASTM) publication D4814-89 (included in Table 1 of the patent). *See id.* at col. 4, l. 66--col. 5., l. 13. Beyond the optimal ranges for individual characteristics, the '393 patent also discloses preferred fuel mixtures. In sum, the '393 disclosure describes with detail the benefits and methods of varying gasoline characteristics. The specification describes 1) the relationships among the eight individual fuel characteristics and CO, NO_x, and HC emissions, 2) characteristics most important for emissions, and 3) specific desirable ranges for RVP, T10, T50, olefins, paraffins, and aromatics.

The appellant refiners originally sued Unocal in district court, seeking a declaratory judgment to invalidate the '393 patent. Unocal counterclaimed, alleging willful infringement of the '393 patent. The district court then construed the claims of the '393 patent, effectively converting the refiners' declaratory judgment action into an infringement defense. Then the district court tried those invalidity issues to a jury. During forty-nine days of trial, the jury heard the testimony of numerous witnesses and considered hundreds of exhibits and demonstrations. *See Unocal I*, slip op. at 6. At the close of all evidence, the district court properly instructed the jury on the law, and presented the jury with a special verdict form. The verdict form required the jury to decide validity under § 102 and § 112 separately for each of the forty-one asserted claims. With respect to the § 112 questions, the trial court asked the jury to consider the '393 patent's specification, including the original claims of the application, as filed. *See Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 938, 15 USPQ2d 1321, 1326 (Fed.Cir.1990) ("The

original claims as filed are part of the patent specification."). In total, the trial court's special verdict form asked the jury 223 individual questions. After thirteen days of deliberation, the jury returned and answered affirmatively that sufficient written description supported each of the forty-one asserted claims, and that none was anticipated under § 102.

The appellant refiners then moved the district court to overturn the jury's verdict with a motion for JMOL based on anticipation, obviousness, and lack of written description. After reviewing arguments of both parties and the record, the district court found that "substantial evidence exists in the record regarding the written description to support the verdict that Drs. Jessup and Croudace had possession of the claimed subject matter." *Unocal I*, slip op. at 6. The district court similarly considered and rejected appellant refiners' arguments on anticipation and obviousness. *See id.* at 3-5.

The appellant refiners also argued that the '393 patent was unenforceable for inequitable conduct. The district court tried that issue itself and held that the refiners did not meet their burden of showing inequitable conduct by clear and convincing evidence. *See Unocal II*, 34 F.Supp.2d at 1222. The district court found the case exceptional, and therefore also awarded attorney fees to Unocal under 35 U.S.C. § 285 (1994).

The appellant refiners now appeal the district court's denial of JMOL on anticipation and written description. They also appeal the district court's inequitable conduct decision.

II.

This court reviews the district court's JMOL ruling after a jury verdict by reapplying the district court's own standard. *See Applied Med. Resources Corp. v. United States Surgical Corp.*, 147 F.3d 1374, 1376, 47 USPQ2d 1289, 1290 (Fed.Cir.1998). Thus, to prevail on appeal, the appellant

refiners must show that substantial evidence does not support the jury's factual findings or that the district court erred in applying the law. *See id.*

A district court may overturn a jury's verdict on a motion for JMOL only if, upon the record before the jury, reasonable persons could not reach the verdict returned by that jury. *See Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893, 221 USPQ 669, 673 (Fed.Cir.1984). This court must consider the evidence of record in the light most favorable to Unocal, drawing all reasonable inferences in its favor, without disturbing the jury's credibility determinations or substituting this court's resolutions of conflicting evidence for those of the jury. *See Applied Med.*, 147 F.3d at 1376-77.

A.

This court requires that a party seeking to invalidate a patent under § 102 show that the allegedly invalidating prior art contains "each and every element of [the] claimed invention." *Lewmar Marine, Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 USPQ2d 1766, 1767 (Fed.Cir.1987). To prevail on anticipation at trial, the refiners had to prove their case by clear and convincing evidence. *See Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1052-53 (Fed.Cir.1987). The law imposes this high burden because Unocal's patent, like any issued patent, enjoys a presumption of validity. *See id.*

This court reviews a finding of anticipation as a question of fact. *See In re Graves*, 69 F.3d 1147, 1151, 36 USPQ2d 1697, 1700 (Fed.Cir.1995). Therefore, on appeal, this court must affirm the district court's denial of JMOL on anticipation if substantial evidence supports the jury's verdict that the cited prior art did not anticipate the claims.

"The first step in any invalidity .. analysis is claim construction." *See Rockwell Int'l Corp. v. United States*, 147 F.3d 1358, 1362, 47 USPQ2d 1027, 1029 (Fed.Cir.1998).

Claim construction is a question of law, which this court reviews without deference. *See Georgia-Pacific Corp. v. United States Gypsum Co.*, 195 F.3d 1322, 1330, 52 USPQ2d 1590, 1597 (Fed.Cir.1999). "In claim construction the words of the claims are construed independent of the accused product, in light of the specification, the prosecution history, and the prior art . . . . [T]he construction of claims is simply a way of elaborating the normally terse claim language[ ] in order to understand and explain, but not to change, the scope of the claims." *Scripps Clinic v. Genentech, Inc.*, 927 F.2d 1565, 1580, 18 USPQ2d 1001, 1013 (Fed.Cir.1991) (internal quotation marks omitted).

The claims of the '393 patent recite either "[a]n unleaded gasoline suitable for combustion in an automotive engine" or "[a]n unleaded gasoline fuel suitable for combustion in a spark ignition automotive engine." Thus, the '393 patent claims compositions of matter. The scope of these composition claims cannot, as the appellant refiners argue, embrace only certain uses of that composition. *See In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed.Cir.1990). Otherwise these composition claims would mutate into method claims. The district court correctly applied this principle, refusing to narrow the scope of the claimed compositions to specific uses.

The district court read each claim in light of the specification, and concluded that the claims cover "fuels that will *regularly* be used in autos, not that conceivably could be." *Union Oil Co. of Cal. v. Atlantic Richfield Co.*, No. CV-95-2379-KMW, slip op. at 7 (C.D. Cal. May 19, 1997) (*Unocal III*). The district court thus construed the claims to cover only a narrow class of fuel compositions, namely only standard automotive gasoline. The district court correctly excluded from claim scope a broader class of petroleum formulations such as aviation fuels or racing fuels. The claim language confirms the district court's reading of the claims to cover mass market automotive gasoline. The claim

language specifies fuels for an "automotive engine," not an aviation engine. *See, e.g.*, '393 patent, col. 18, l. 65. Moreover the explicit reference to "unleaded gasoline" again invokes standard automotive fuels, rather than specialized fuels. *See, e.g., id.* at col. 18, l. 64.

The district court's interpretation also finds extensive support in the specification. The patentees described the problem that their invention addressed:

> One of the major environmental problems confronting the United States and other countries is atmospheric pollution (i.e., "smog") caused by the emission of gaseous pollutants in the exhaust gases from automobiles. This problem is especially acute in major metropolitan areas, such as Los Angeles, Calif., where the atmospheric conditions and the great number of automobiles account for aggravated air pollution.

Id. at col. 1, ll. 9-16. Similarly, the patentees describe their testing procedures and results in the specification. Specifically, the patentees used ordinary passenger automobiles in their tests. The '393 patent records the results of testing certain fuels in a 1989 Oldsmobile Calais, a 1988 Oldsmobile 98, a 1985 Ford Tempo, a 1990 Lincoln, a 1984 Chevrolet Caprice, a 1988 Honda Accord, a 1989 Ford Taurus, a 1990 Plymouth Shadow, a 1985 Chevrolet Suburban, and a 1990 Toyota Camry. *See id.* at fig. 9. None of these are aviation or racing vehicles.

Similarly, another passage provides context for the trial court's claim construction. The patentees describe their choice of test vehicles as follows:

> A total of 22 different unleaded gasoline fuels was tested in a 1988 Oldsmobile Regency 98

> automobile equipped with a 3800 cc V-6 engine. This automobile was selected because it represented a high sales volume product with close to the current state-of-the-art emission technology.

Id. at col. 7, ll. 61-6. The patentees tailored their research and their patent to ordinary fuels for use in standard passenger cars. Thus, the claim language, further informed by the specification, shows that the district court correctly read the claims to cover ordinary automotive fuel.

Because the '393 patent covers only standard automotive fuel, the district court correctly determined that specialty fuels within other limitations of the claims do not anticipate under 35 U.S.C. § 102. In other words, the aviation and racing fuels that allegedly invalidate the '393 claims do not anticipate because they do not contain each and every limitation of the claims. *See Verdegaal*, 814 F.2d at 631. Specifically, this alleged prior art does not include the limitation of being a standard automotive fuel composition.

Moreover, the record does not show that the aviation and racing fuels otherwise have the claimed characteristics of the particular standard automotive fuels recited in the '393 patent. While the record shows that some properties of the aviation and racing fuels coincide with the properties of the '393 patent's claims, the record does not show the presence of each and every limitation. An expert for the refiner appellants stated that the allegedly anticipatory Phillips B-35 racing fuel "is very different from typical [automotive fuel]." Tr. at 4782. When asked, "Is Unocal unleaded racing gasoline very different from typical motor gasoline?", the expert again answered "Yes." *Id.* at 5047. This expert similarly answered "yes" when questioned about whether the asserted aviation fuels were "very different" from typical motor gasoline. *See id.* at 5060.

The district court did not err in construing the claims of the '393 patent. Furthermore the record does not show each and every element of the asserted claims of the '393 patent present in any single prior art reference. Therefore, this court affirms the district court's denial of JMOL on anticipation.

B.

The first paragraph of § 112 states that: "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." 35 U.S.C. § 112. In written description cases, "[t]he primary consideration is *factual* and depends on the nature of the invention and the amount of knowledge imparted to those skilled in the art by the disclosure." *In re Wertheim*, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976) (emphasis added). This court reviews a jury's factual findings for substantial evidence. *See B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1423, 43 USPQ2d 1896, 1899 (Fed.Cir.1997).

The written description requirement does not require the applicant "to describe exactly the subject matter claimed, [instead] the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed.Cir.1989) (citations omitted). Thus, § 112, ¶1 ensures that, as of the filing date, the inventor conveyed with reasonable clarity to those of skill in the art that he was in possession of the subject matter of the claims. *See Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed.Cir.1991).

In the course of the lengthy jury trial, the district court heeded this court's counsel to use special verdicts in complex cases. *See Comark Communications, Inc. v. Harris Corp.*,

156 F.3d 1182, 1189 n.1, 48 USPQ2d 1001, 1006 n.1 (Fed.Cir.1998). The district court presented the jury with a verdict form asking it to decide separately whether each of the claims met the written description requirement. Following these instructions, the jury returned its verdict answering affirmatively forty-one separate times that sufficient written description supported each of the asserted claims.

After the jury's verdict, the appellant refiners renewed their motion for JMOL to overturn the jury's verdict. *See* Fed.R.Civ.P. 50(b). The district judge then reconsidered the patent documents independently in light of all the evidence and denied the JMOL motion, thus upholding the jury's verdicts. Like the district court, this court must accord deference to the jury findings on written description. This court will not substitute its judgment for that of the fact finder. *See General Electro Music Corp. v. Samick Music Corp.*, 19 F.3d 1405, 1412, 30 USPQ2d 1149, 1155 (Fed.Cir.1994).

On the record in this appeal, substantial evidence amply supports the jury's findings and the trial judge's JMOL ruling. The '393 patent teaches the effects of varying the properties of automotive gasolines to reduce harmful tailpipe emissions. In the art of gasoline production, skilled refiners obtain raw petroleum products and mix them together to achieve a desired product. Each product is the mixture of many chemicals in varying proportions. The '393 patent teaches that changes in the proportions of different hydrocarbon-containing streams mixed to produce gasoline with specific properties reduces the amount of NO_x, CO, and hydrocarbons emitted from an automobile engine. Varying one or more properties in turn affects other properties of a gasoline product. Therefore, the patent claims its inventive products in terms of ranges of chemical properties, which work in combination with ranges of other chemical properties to produce a gasoline that reduces emissions.

Appellant refiners assert that the specification does not describe the exact chemical component of each combination that falls within the range claims of the '393 patent. However, neither the Patent Act nor the case law of this court requires such detailed disclosure. *See In re Hayes Microcomputer Prods., Inc.*, 982 F.2d 1527, 1533, 25 USPQ2d 1241, 1245 ("[The applicant] does not have to describe exactly the subject matter claimed."); *Vas-Cath*, 935 F.2d at 1566 ("ranges found in applicant's claims need not correspond exactly to those disclosed in [the specification]; issue is whether one skilled in the art could derive the claimed ranges from the [ ] disclosure."). Rather, the Patent Act and this court's case law require only sufficient description to show one of skill in the refining art that the inventor possessed the claimed invention at the time of filing.

Drs. Jessup and Croudace described their invention in terms of ranges. That form of description does not offend § 112, ¶ 1. In fact, this invention lends itself to description in terms of ranges and variance of those ranges to achieve particular properties of the gasoline products. The inquiry for adequate written description simply does not depend on a particular claim format, but rather on whether the patent's description would show those of ordinary skill in the petroleum refining art that the inventors possessed the claimed invention at the time of filing.

In this case, the patent teaches one of ordinary skill that reducing T50 progressively reduces CO and hydrocarbons; reducing olefins progressively reduces NO_x and hydrocarbons; increasing paraffins progressively reduces CO and NO_x; and so forth with several other relationships. Then the patent claims ranges for these properties that provide cleaner gasoline emissions. The Background and Abstract portions of the specification discuss thoroughly the claimed ranges and the combinations of multiple properties.

For example, the written description supporting a single claim – claim 117 – follows:

Claim Limitation	Support in '393 Patent
T50 at ≤ 200°	Col. 14, ll. 9-15: "no greater than 210° F. . . . but **preferably . . . less than 200° F. . . .**"
RVP at ≤ 7.0 psi	Col. 14, ll. 36-40: "Reid Vapor Pressure specification of 8.0 psi . . . **even more preferably no greater than 7.0 psi . . .**"
Olefin at ≤ 4.0 volume percent	Col. 14, ll. 23-30: "varying the olefin content, this value is generally maintained less than 15 volume percent, with decreasing values providing progressively improved results. Thus, it is contemplated that each unit reduction, e.g., to values **below . . . 4 . . . providing progressively better results . . .**"
Paraffin at > 85 volume percent	Col. 14, ll. 49-64: "progressively increasing the paraffin content progressively decreases the CO emitted. Accordingly . . . the paraffin content would be increased to . . . and **most preferably of all above 85 volume percent . . .**"
T90 at ≤ 300°	claimed exactly in original claim 29[4]
T10 at ≤ 158°	Col. 5, lls. 6-30: Table 1 shows maximum T10 distillation temperatures for all five volatility classes at **158 or below**.

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[4] One of this court's predecessor courts clarified that disclosure in an originally filed claim satisfies the written description requirement. *See In re Gardner*, 480 F.2d 879, 880, 178 USPQ 149 (CCPA 1973) ("Under these circumstances, we consider the original claim in itself adequate 'written description' of the claimed invention. It was equally a 'written description' . . . whether located among the original claims or in the descriptive part of the specification.").

(Emphasis added.)

The specification further guides the skilled artisan in combining the above properties: "It will also follow that one can increase or decrease any combination of the eight properties listed above, i.e., at least two, at least three, at least four, etc., of the properties can be increased or decreased in the direction indicated above, as well as all eight." '393 patent, col. 15, ll. 20-25. The record of the trial contains testimony and exhibits showing in similar terms the written description and support for each of the forty-one claims.

To reiterate, this court supplies the written description supporting another claim, claim 125, as follows:

Claim Limitation	Support in '393 Patent
T50 at ≤ 205°	Col. 2, ll. 17-18: "Preferred fuels have a 50% D-86 Distillation Point **of 205° F. (96.1° C) or less.**"
RVP at ≤ 7.0 psi	Col. 14, ll. 36-40: "Reid Vapor Pressure specification of 8.0 psi . . . **even more preferably no greater than 7.0 psi** . . ."
Olefin at < 6.0 volume percent	Col. 14, ll. 23-30: "varying the olefin content, this value is generally maintained less than 15 volume percent, with decreasing values providing progressively improved results. Thus, it is contemplated that each unit reduction, e.g., to values **below** . . . **6** . . . **providing progressively better results** . . ."
Paraffin at > 75 volume percent	Col. 14, ll. 49-59: "progressively increasing the paraffin content progressively decreases the CO emitted. Accordingly . . . the paraffin content would be increased to . . . [and] **even more preferably above 75 volume percent** . . ."

(Emphasis added.)

Beyond this evidence from the patent itself, skilled refiners testified that the specification taught them that the

inventor possessed the emission-reducing gasolines at the time of filing. For example, when questioned, Richard Stellman, an expert in the field, stated:

> Q. Does the patent teach one of ordinary skill in the art such as yourself to alter two or more of the properties in a particular - in the prescribed fashion in order to affect all three of the criteria pollutants?
>
> A. Yes, it does.
>
> Q. And does the patent set forth values from which one of ordinary skill in the art can practice the invention?
>
> A. Yes, it does.

Tr. at 2515.

The patent unmistakably informs skilled refiners to increase or decrease the various components to arrive at preferred combinations. In fact, the written description usually labels both preferred and most preferred levels within each range. Skilled refiners testified that they knew the composition of the claimed combinations based on this written description. Contrary to appellant refiners' arguments to this court, the record shows that refiners of ordinary skill understood and applied the '393 patent's teachings. In sum, the record shows that the inventors possessed the claimed invention at the time of filing in the assessment of those of ordinary skill in the petroleum refining art.[5] Moreover, the

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[5] The dissent contends that the specification does not show that the inventors possessed the amended claims at the time of filing. In its arguments, the dissent discounts the skill in this art, which, the jury found, knows the composition of gasolines from the specification's description of

(continued...)

jury in this case reached the same conclusion as a matter of fact–a proposition that this court cannot disturb on this record which supplies substantial evidence to support that finding.

The appellant refiners attempt to rescue their written description argument by focusing on the T90 levels cited in claims 74, 81, 116, 117, and 127. Appellant refiners allege that the "specification provides no specific T90 values . . . [and that a]lthough five of the original application claims recited combinations including a T90 limitation, they bear no resemblance to the remaining claims with T90 limitations." Appellants' Br. at 46. Appellant refiners misapprehend the teachings of T90 levels. The '393 patent teaches that lowering the T90 distillation point below prior art standards for automotive gasolines creates the desired effect. *See* '393 patent, col. 2, l. 1. The standards set forth in Table 1 of the '393 patent describe the ASTM standards for gasolines that have T90 distillation points between 365 and 374° F. The T90 distillation points in the originally filed claims were less than or equal to either 315 or 300° F, thus substantially lower than in the prior art gasolines. The claimed ranges of the originally filed claims are the same as those set forth in the six claims of the issued '393 patent that contain T90 limitations. In other words, the disclosure at the time of filing taught one of skill in the art that the inventors possessed the subject matter of the later claims. Even if appellant refiners' argument were correct, that analysis only

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(footnote continued)

characteristics. Further, the dissent discounts the jury's role in finding, as a matter of fact, that the inventor satisfied the written description requirement, preferring instead its own "findings" about the knowledge of skilled artisans and about the sufficiency of the disclosures.

addresses the validity of five claims, leaving the remaining thirty-six claims.

Appellant refiners argue that *In re Ruschig*, 54 C.C.P.A. 1551, 379 F.2d 990, 154 USPQ 118 (CCPA 1967), supports their argument. This court's predecessor discussed in *Ruschig* whether a claim for a particular pharmaceutical compound copied into a patent application for the purposes of provoking an interference was adequately supported by the written description of a class of compounds. *Ruschig* is different than this case for several reasons. First, the *Ruschig* case involved a copied claim (another inventor's claim copied into Ruschig's application), which did not find support in Ruschig's application because Ruschig had invented and disclosed a broad set of the compounds that was similar, but not entirely within the scope of the claim. Because another inventor, not Ruschig, drafted the claim at issue to fit another specification, it is not surprising that the disputed claim did not find support in Ruschig's specification, even though the inventions were similar. In this case however, the claims, although amended in the course of prosecution, were drawn to the inventions of Jessup and Croudace, who drafted the claims with support from their own specification.

Second, as this court's predecessor explained in distinguishing *Ruschig* in another case involving ranges:

> If lack of literal support alone were enough to support a rejection under § 112, then the statement of *In re Lukach* ... that "the invention claimed does not have to be described in ipsis verbis in order to satisfy the description requirement of § 112," is empty verbiage.

Wertheim, 541 F.2d at 265. As in this case, in *Wertheim* the asserted claims covered a range ("solids level of at least 35%"), *id.* at 258, whereas the specification disclosed a broader range ("concentrated ... until a concentration of 25

to 60% solid matter is reached"), *id.* at 262 (internal quotation marks omitted). In *Wertheim* the CCPA held that the specification supported the claimed range, even though the precise range of the claim was not repeated verbatim in the specification, as the dissent in this case would appear to require. In so holding, the court cautioned that it would "let form triumph over substance" if it allowed the written description requirement to eviscerate claims that are narrowed during prosecution, simply because the patent applicant broadly disclosed in the original patent application but then narrowed his claims during prosecution. *See id.* at 263. Additionally, *Wertheim* reiterates the often cited rule that written description questions are intensely factual, and should be dealt with on a case-by-case basis, without the application of wooden rules. *See id.* at 262. Thus, *Wertheim* fully supports the result in this case and limits the applicability of *Ruschig*.

Our predecessor court in *Ruschig* expressed concern over the extent to which the patentee relied on variables in describing structures, leading that court to explain that rather than blaze marks on trees, the patentee had simply provided the public with a forest of trees. Artisans skilled in petroleum refining, in contrast, are aware of the properties of raw petroleum sources and know how to mix streams of such sources to achieve a final product with desired characteristics. Thus the patentee in this case taught the desired characteristics of the final automotive fuels, realizing that those of skill in this art know that those characteristics define the claimed products.

A closer case for assessing the facts of written description in these forty-one verdicts–one which dealt with ranges and combinations – is *Ralston Purina Co. v. Far-Mar-Co, Inc.*, 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed.Cir.1985). In *Ralston*, a case in which this court applied the less deferential clear error standard appropriate for this court's review of

bench verdicts, this court noted that the ranges in applicant's claims need not correspond exactly to those disclosed in the parent application. *See id.* at 1575. Rather, this court clarified that the issue is whether one of skill in the art could derive the claimed ranges from the parent's disclosure. *See id.*; *see also Vas-Cath*, 935 F.2d at 1566 (holding that the district court erred in "applying a legal standard that essentially required the drawings of the '081 design application to necessarily exclude all diameters other than those within the claimed range."). Because of the fact-sensitive nature of the written description inquiry, this court has often warned against misapplication of precedents in this area. *See Vas-Cath*, 935 F.2d at 1562 (citing *In re Driscoll*, 562 F.2d 1245, 1250, 195 USPQ 434, 438 (CCPA 1977)). This case illustrates the reason for that warning. *Ralston* governs this case.

The written description requirement does not require identical descriptions of claimed compounds, but it requires enough disclosure in the patent to show one of skill in this art that the inventor "invented what is claimed." *Vas-Cath*, 935 F.2d at 1563. On this precise question the jury received many days of testimony, heard from skilled refiners, reviewed graphs and claim charts, and examined the patent documents as guided by those skilled in the art. Indeed the district court, which also heard all the evidence from those of skill in the art, stated: "[T]he Court finds that substantial evidence exists in the record regarding written description to support the verdict that Drs. Jessup and Croudace had possession of the claimed subject matter." *Unocal I*, slip op. at 6. This court agrees. Because the record shows substantial evidence of adequate written description for each claim as the jury found, this court affirms.

III.

Applicants for U.S. patents and their representatives before the PTO are subject to a duty of candor, good faith

and honesty in their prosecution of patent applications. *See* 37 C.F.R. § 1.56 (1999). "A breach of this duty constitutes inequitable conduct." *Molins PLC v. Textron, Inc.*, 48 F.3d 1172, 1178, 33 USPQ2d 1823, 1826 (Fed.Cir.1995). If a court determines that a patentee has engaged in inequitable conduct, the court must consider whether, as a matter of equity, the patent should be deemed unenforceable. *See LaBounty Mfg., Inc. v. ITC*, 958 F.2d 1066, 1070, 22 USPQ2d 1025, 1028 (Fed.Cir.1992). Because as the name suggests, inequitable conduct is an equitable issue, this court reviews such determinations for an abuse of discretion. *See Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 876, 9 USPQ2d 1384, 1392 (Fed.Cir.1988) (*en banc* in relevant part). Moreover this court will not disturb the district court's factual determinations of materiality and intent without a "definite and firm conviction that a mistake has been committed." *Id.*

In this case, the district court issued a thorough and well reasoned opinion that shows consideration of the fundamental issues of inequitable conduct. Specifically, the district court noted that the allegedly withheld test data would not have been material to the patentability of the claims. *See Molins*, 48 F.3d at 1179. The district court also found no intent to deceive by withholding the disputed test records, but instead determined that Unocal acted in good faith during the prosecution. This court detects no clear error in these findings and no abuse of discretion in the district court's determination of no inequitable conduct.

IV.

Because the record contains substantial evidence to support the jury's verdicts of no anticipation and sufficient written description, this court affirms the district court's denial of JMOL. Similarly, this court affirms the district court's inequitable conduct determination.

COSTS

Each party shall bear its own costs.

AFFIRMED.

DISSENTING OPINION

LOURIE, Circuit Judge, dissenting in part.

Because the jury's verdict that the claims are not invalid for lack of written description is not supported by substantial evidence, I would reverse the district court's denial of the motion for JMOL, hold the relevant claims to be invalid, and vacate the damages and attorney fees awarded to Unocal. Because the district court did not abuse its discretion in concluding that Unocal did not engage in inequitable conduct, I would affirm that decision. I would not reach the anticipation issue.

Unocal's '393 patent is directed to specific gasoline compositions, albeit compositions defined by ranges of properties. No matter how an invention is claimed, it must be described in the specification. The claimed compositions were not so described. The majority supports its affirmance of the denial of the JMOL using enablement reasoning. It points to the numerous references in the specification to teachings of the various ways one may obtain particular combinations of properties for the fuels. These are *general* descriptions of how to make fuel compositions, not descriptions of the *claimed* compositions. They may also constitute descriptions of *processes* for obtaining various *characteristics* of fuel compositions, but it is specific *compositions* that are claimed here, not processes. There are written descriptions of other particular compositions in the specification, but they are not written descriptions of the inventions claimed here. It is in fact undisputed that the specification discloses no distinct embodiments corresponding to any claim at issue.

The majority supports its decision in part with two charts purporting to show detailed support in the specification for claims 117 and 125. However, the description that the majority provides, with commendable thoroughness, shows the weakness of its conclusion. The claimed compositions do not appear in the specification as such. The charts were synthesized by pulling together various directions in the specification in order to constitute the claimed compositions. Note the references to different parts of the specification for the various components. The patent does not contain such complete descriptions of those compositions; they were presumably prepared after the grant of the patent for purposes of litigation by Unocal. Erroneously, they were accepted by the jury, the trial judge, and the appellate majority.

Unocal's original application contained 82 claims. During the course of prosecution, 161 claims were added and 47 canceled. Ultimately, 196 claims issued, but Unocal later disclaimed all but the 41 at issue in this case. None of these claims were in the original application; all were added by amendment.

The written description requirement ensures that, at the time a patent application is filed, the inventor has possession of the invention claimed. *See Vas-Cath v. Mahurkar*, 935 F.2d 1555, 1563, 19 USPQ2d 1111, 1116 (Fed.Cir.1991). It also serves the obvious purpose of telling the public what it is that has been invented. Possession of the invention at the time of filing is best shown by a precise description in the text of the patent specification of all of the aspects of the claimed invention. It is well-established that each claim in a patent constitutes a separate invention, *see, e.g., Jones v. Hardy*, 727 F.2d 1524, 1528, 220 USPQ 1021, 1024 (Fed.Cir.1984); thus, a written description of the invention of each claim as such must be provided if the statutory requirement is to be met as to that claim.

It is true that a patent need not describe the claimed subject matter in precisely the same terms as used in the claims, *see Vas-Cath*, 935 F.2d at 1563-64, 19 USPQ2d at 1116; however, it must still describe the invention with all its claimed limitations in some manner, *see Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed.Cir.1997); *In re Wertheim*, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1979). "Precisely how close the original description must come to comply with § 112 must be left to case-by-case development." *Vas-Cath*, 935 F.2d at 1561, 19 USPQ2d at 1116 (citing *In re Smith*, 59 C.C.P.A. 1025, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972)).

It is clear beyond peradventure that there is no written description of any of the claimed compositions as such. There surely is a description of most of the particular *claim limitations* of the various claims, but that is not the same as a description of a *specific composition* described by a particular selection of those characteristics. If the written description does not use precisely the same terms used in a claim, the question then is whether the specification directs or guides one skilled in the art to the subject matter claimed. *See, e.g., Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570, 39 USPQ2d 1895, 1904 (Fed.Cir.1996). One of our predecessor courts analogized the requirement that the written description direct one to the claimed subject matter to "blaze marks" on specific trees that mark a trail through a forest. *See In re Ruschig*, 54 C.C.P.A. 1551, 379 F.2d 990, 994-95, 154 USPQ 118, 122 (CCPA 1967). It found that a broad generic disclosure failed to constitute a description of a specific claimed compound. We have subsequently stated that without such specific direction, a general disclosure will not be sufficient to support narrowly claimed subject matter. *See Fujikawa*, 93 F.3d at 1571, 39 USPQ2d at 1905 ("In the absence of [ ] blazemarks [that the claimed compounds were of special interest], simply describing a large genus of

compounds is not sufficient to satisfy the written description requirement as to particular species or subgenuses."). That direction must be expressed in "full, clear, concise, and exact" language. *See Fields v. Conover*, 58 C.C.P.A. 1366, 443 F.2d 1386, 1391, 170 USPQ 276, 280 (CCPA 1971); *In re Ahlbrecht*, 58 C.C.P.A. 848, 435 F.2d 908, 911, 168 USPQ 293, 296 (CCPA 1971); *Ruschig*, 379 F.2d at 996, 154 USPQ at 123.

Each of the claims at issue here recites a fuel having a specific combination of different fuel characteristics. Although the specification separately describes most of the individual characteristics of the combinations, it is undisputed that none of the claims at issue is matched in the specification by the combination of characteristics required by that claim. A reasonable juror could not find that the application shows possession of those combinations of characteristics by blazing a clear trail to them.

Unocal points to descriptions of individual fuel characteristics at column 14 of the specification, as well as to the prosecution history. However, column 14 simply outlines the range of variation of T10 and T50, olefin content, and RVP in order to obtain emission reductions. This is an enablement disclosure, not a description of particularly claimed compositions. Describing these individual fuel characteristics in broad terms is not the same as describing an invention reciting specific combinations of fuel characteristics. The question is not whether each of the claim limitations finds support in the specification but whether the inventions claimed, fuels having *specific combinations of characteristics*, finds such support. The simple direction to adjust more than one fuel characteristic at a time does not direct one to, and thus does not show possession of, any of the claimed combinations of fuel characteristics. One must pick and choose among eight different types of fuel characteristics, broadly described, in order to arrive at any of the claimed combinations.

For example, as indicated earlier, to arrive at one of the combinations described in claim 117, Unocal had to pick through the specification to find the claimed limitations. Four of the limitations – the T50, RVP, olefin, and paraffin limitations – fell within ranges *broadly described*, but there is no direction to a composition having all of these limitations in the *particular ranges claimed*. Furthermore, no specific T90 ranges are described anywhere in the specification except in Table 1, which recites only certain general ASTM standards. Unocal had to point to an original, canceled claim to support the T90 value chosen, but that characteristic was part of a composition no longer claimed and no longer part of the specification. Lastly, the specification repeatedly describes fuels with a T10 less than 140° F, but the claim recites a fuel with a maximum T10 of 158° F. The specification's only recitation of a fuel with a T10 of 158° F is one of the ASTM standards in Table 1, not a part of a described embodiment of the invention. By picking and choosing, one can thus find all of the limitations, but the specification gives no direction, let alone the "full, clear, concise, and exact" direction required, to the claimed combination. The same picking and choosing is required to arrive at all of the claims asserted. When one has to pick and choose among a wide range of variables to construct a claim, the subject matter of that claim has not been described as required by the statute; possession has not been demonstrated.

Unocal makes numerous references to what the specification teaches. It does so by referring to general descriptions of the possible variables. The specification does in fact contain a written description of methods for lowering auto emissions. It also teaches how to make various *types* of compositions and methods, but does not contain a written description of the *specifically claimed* compositions. It is well settled that the enablement requirement is separate and distinct from the written description requirement of § 112,

¶ 1, *see Vas-Cath*, 935 F.2d at 1563, 19 USPQ2d at 1117, and that a specification may enable one skilled in the art to make and use an invention and yet still not describe it, *see id.* at 1562, 935 F.2d 1555, 19 USPQ2d at 1115. Whether the specification fulfills the enablement requirement by teaching how to make the claimed combinations is not before us; the fact remains that it does not describe any one of the claimed compositions. In fact, the extensive recitation of differing ranges and preferences for particular characteristics is in stark contrast to the lack of any specific description of a composition, particularly a composition set forth in the current claims.

Unocal's reference to the broad ranges of the characteristics of the various gasolines also may be an adequate written description of a generic group of gasolines defined broadly by those characteristics. However, such a generic claim is not before us. We only have claims defining compositions by a specific set of claim limitations, none of which compositions finds a specific description in the patent specification. In *Ruschig*, the Court of Customs and Patent Appeals held that a general formula containing variables that each include a number of possible groups does not describe each composition within its scope. The court stated that "[s]pecific claims to single compounds require reasonably specific supporting disclosure...." *Ruschig*, 379 F.2d at 994, 154 USPQ at 122. The same applies to the specific compositions here. The court in *Ruschig* found certain alleged "guides" in the specification inadequate, stating that "we are looking for blaze marks which single out particular trees. We see none." *Id.* at 995, 54 C.C.P.A. 1551, 379 F.2d 990, 154 USPQ at 122. The court distinguished the written description requirement from enablement, which it considered might have been satisfied by the specification. *See id. Ruschig* is directly pertinent to the present case, and the fact that Unocal's patent claims multiple species of compositions in no way lessens the force of *Ruschig* as

relevant precedent here. Each of the claims in the '393 patent suffers from the same defect.

Attempting to distinguish *Ruschig*, the majority asserts that this is a *Ralston Purina* case, but the *Ralston Purina* opinion itself states that written description cases must be decided on a case-by-case basis. *See Ralston Purina Co. v. Far-Mar-Co, Inc.*, 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed.Cir.1985). In finding satisfaction of that requirement, it distinguishes a number of cases in which the requirement was not met "due to a number of different factors." *See id.* The case-by-case analysis advocated in *Ralston Purina* leads in this case to the reality that the requirement has not been satisfied.

I recognize that this is a jury trial and that the written description requirement is a question of fact concerning which we owe considerable deference. However, jury verdicts are not irreversible if substantial evidence is lacking. Substantial evidence is that minimum quantum of evidence from which a reasonable jury might afford relief. *See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 249-50, 106 S. Ct. 2505, 91 L.Ed.2d 202 (1986) (holding that "merely colorable" or "not significantly probative" evidence is insufficient to meet the substantial evidence standard); *Consolidated Edison Co. v. NLRB*, 305 U.S. 197, 229, 59 S. Ct. 206, 83 L. Ed. 126 (1938) ("Substantial evidence is more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion."). If a reasonable jury could not have found the facts necessary to support a verdict, the trial judge or reviewing court should reverse.

This is a highly complicated case, involving a patent that is difficult to fathom. One needs to analyze these claims the way one plans a trip, with a road map, in detail, on paper. Multiple claim dependencies and multiple claim limitations make the task difficult. The complexity of the case is further

increased by the way in which the patent application was prosecuted, with wholesale cancellation and addition of claims seemingly irrespective of whether their subject matter was properly disclosed. It is easy to see how one could go astray.

A reasonable juror is one who has done his or her homework, as described above, in order to determine what each claim covers, and where in the specification there is support for such claims. The result here speaks for itself. When such analysis is performed here, it is plain that the claimed compositions are not described in the patent. No reasonable jury, carefully reading and examining the patent specification, could conclude otherwise, *i.e.*, that the patent specification's descriptions of individual fuel characteristics or the teachings that multiple fuel characteristics can be varied in particular ways constitutes a sufficient written description of the compositions of any of the claims. I therefore respectfully dissent from the conclusion of the majority that the claims have not been shown to be invalid.

UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

ATLANTIC RICHFIELD COMPANY,
CHEVRON U.S.A., INC.
EXXON CORPORATION,
MOBIL OIL CORPORATION,
SHELL OIL PRODUCTS COMPANY and
TEXACO REFINING AND MARKETING, INC.,

Plaintiffs,

v.

UNOCAL CORPORATION and
UNION OIL COMPANY OF CALIFORNIA,

Defendants.

No. CV-95-2379-KMW (JRx)

May 19, 1997

MEMORANDUM OF DECISION GRANTING IN PART AND DENYING IN PART PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT FOR CONSTRUCTION OF THE '393 PATENT AS A MATTER OF LAW AND FOR LACK OF NOVELTY

Before WARDLAW, District Judge.

The Court has considered Plaintiffs' Motion for Summary Judgment of Invalidity of the '393 Patent for Lack of Novelty. The Court **GRANTS** Plaintiffs' motion to the extent that it requests that the Court construe the patent. The Court finds as a matter of law that the patent applies to

traditional motor fuels designed for regular use in the common automobile. However, the Court **DENIES** the motion to the extent that it seeks to invalidate the patent, as it finds a genuine issue of material fact as to the novelty of the claimed invention.

I. Background

Defendants Unocal Corporation and Union Oil Company of California ("Defendants") are the holders of United States Patent 5,288,393 (the "'393 patent"), dated February 22, 1994. The patent is entitled "gasoline fuel" and claims compositions producing an unleaded automotive fuel to reduce polluting emissions. The abstract of the patent reads as follows:

> By controlling one or more properties of a gasoline fuel suitable for combustion in automobiles, the emissions of NO_x, CO and/or hydrocarbons can be reduced. The preferred fuel for reducing all three such emissions has a Reid Vapor Pressure no greater than 7.5 psi (0.51 atm), essentially zero olefins, and a 50% D-86 Distillation Point greater than about 180 [degrees] F. (82 [degrees] C.) but less than 205 [degrees] F. (96.1 [degrees] C.)

'393 Patent Abstract.

Plaintiffs are competitor oil companies seeking a declaration of invalidity or unenforceability against the '393 patent on various grounds. The gist of this summary judgment motion is that the patent is invalid for lack of novelty under 35 U.S.C. § 102, if it is construed in the manner Plaintiffs suggest, and relevant prior art is taken into account. Plaintiffs' motion is based on an unrealistically broad construction of the patent. The Court construes the claims in a much narrower fashion. Having done so, however, the Court finds that there exists a genuine issue as

to whether the claims, as construed, teach a new improvement or merely state a new use for an existing fuel composition. Therefore, Plaintiffs' motion must be granted in part and denied in part.

II. Claim Construction

Plaintiffs ask the Court to construe the patent broadly so as to encompass certain fuels urged as prior art. The Court agrees that the claim must be construed as the first step where infringement is at issue. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1581 (Fed. Cir. 1996). Therefore, the Court will treat this motion as a request for construction of the patent, and will proceed to determine as a matter of law the meaning of the claims.[1]

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[1] Although Plaintiffs moved on April 23, 1997 for a *Markman* hearing, the need for such a hearing is belied by Plaintiffs' previous assertions in their moving papers and in oral argument. *See* Plaintiffs' Motion at 8 n.6 ("This motion for summary judgment turns on claim interpretation and presents the Court with the opportunity to resolve that issue prior to trial."); Transcript of Apr. 7, 1997 Hearing ("Tr.") at 8 lines 5-10 ("[A]nd another thing that we do agree on with both the defendants and with the Court is that you don't need to reach extrinsic evidence in this case. The intrinsic evidence is enough. We agree with you that it is unambiguous and that it can be decided and should be decided as a matter of law and on the intrinsic evidence."); Tr. at 12 lines 1-7 ("[A]gain, we agree that this is for you to decide and whether it's on summary judgment or *Markman*, you're going to tell us what this language means, and this trial is going to be determined by that decision. So this is essentially–the decision that you make on this motion will be . . . dispositive for the claim construction as we go forward.").

(continued...)

A. General Principles

Claim construction is a matter of law for the trial court. *Markman v. Westview Instruments, Inc.*, 116 S. Ct. 1384, 1393 (1996). The court evaluates the meaning of the patent based on intrinsic evidence, which includes the plain language of the patent, the specification, and the prosecution history. *Vitronics,* 90 F.3d at 1582. "It is well-settled that in interpreting an asserted claim, the court should look to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history. Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." *Id.* at 1582 (citations omitted). If analysis of intrinsic evidence leaves an ambiguity, the court may consider extrinsic evidence, such as expert testimony; however, if, as here, the patent is unambiguous, resort to

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(footnote continued)

Clearly, Plaintiffs had fully intended that the claim be construed based on the papers and evidence submitted in support of this motion. Apparently Plaintiffs altered this position upon reviewing the Court's tentative decision indicating that while the Court agreed that the issue of claim construction was properly before it, it disagreed with Plaintiffs' interpretation of the claims.

The Court finds that the claims are unambiguous and can be construed by examining the intrinsic evidence here submitted without need for further clarification. Accordingly, it would be legal error to consider extrinsic evidence, rendering any further evidentiary material to be submitted in the requested *Markman* hearing inappropriate for the Court's consideration. Therefore, the Court denies Plaintiffs' request.

extrinsic evidence constitutes legal error. *Vitronics*, 90 F.3d at 1583. The rationale behind this restriction is that the intrinsic evidence constitutes the public record for the patent; the public and competitors are entitled to rely on that record. *Id.* "Allowing the public record to be altered or changed by extrinsic evidence introduced at trial, such as expert testimony, would make this right meaningless. The same holds true whether it is the patentee or the alleged infringer who seeks to alter the scope of the claims." *Id.*

B. Intrinsic Evidence

The following analysis of the intrinsic evidence of the meaning of the '393 patent leaves no ambiguity as to the proper construction of its claims.

1. Patent Language

The language in the '393 patent specification describes with striking clarity the coverage of the claims, and "serves as a concordance for the terms used in the claims." I Donald S. Chisum, *Patents* G1-21. The specification references auto emissions explicitly: one must stretch to attempt to impose any other meaning on the claims. The patent throughout contains numerous references to automobiles that can leave no doubt in the mind of a reader that the invention is intended solely for automobile fuel. The project was embarked upon specifically to address the problem of auto emissions in congested cities contributing to smog:

> The present invention relates to fuels, particularly gasoline fuels, and combustion methods therefor, and methods for preparing gasoline fuels which, upon combustion, minimize the release of CO, NO_x, and/or hydrocarbon emissions to the atmosphere.
>
> One of the major environmental problems confronting the United States and other countries is atmospheric pollution (i.e.,

> "smog") caused by the emission of gaseous pollutants in the exhaust gases from automobiles. This problem is especially acute in major metropolitan areas, such as Los Angeles, Calif., where the atmospheric conditions and the great number of automobiles account for aggravated air pollution.
>
> It is well known that the three primary gaseous constituents, or pollutants, which contribute to air pollution due to auto exhaust are nitrogen oxides (NO_x), carbon monoxide (CO), and unburned or incompletely burned hydrocarbons (i.e., hydrocarbon components originally present in the gasoline fuel which are not fully converted to carbon monoxide or dioxide and water during combustion in the automobile engine).

Col. 1:4-24. The fuel was tested only on popular models of automobiles. Figs. 1-9, Col. 7:60 - Col. 13:45. The patent discusses the fuel solely as applied to automobiles and refers to the fuel as being used by "the motoring public." The patent is rife with explicit discussions of the invention's use, confined to the automobile context. For example:

> While the invention may be used to advantage even on a small volume basis, e.g., a single automobile operating with a fuel composition of the invention for a week or for at least 200 consecutive miles, it is clear that the benefits offered by the invention are best taken advantage of when a large number of automobiles operating with spark induced internal combustion engines requiring a gasoline fuel are powered with the fuel of the invention.

Col. 15:47-55. Further,

> To provide for the needs of such high population density areas, it may be necessary to supply the fuel composition of the invention from more than one refinery, and to deliver it to a large fraction of the gasoline service stations in such area . . . so that a large number of automobiles can be supplied with the inventive fuel on a daily basis . . . .

Col. 17:31-38. The intent of the inventors to design an automobile fuel specifically for use in reducing polluting emissions could scarcely be clearer.

The patent's usage of terms and properties to distinguish between the patented gasolines and regular automobile gasoline illustrates the benefits and improvements of the invention, but does not, as Plaintiffs claim, indicate that the patented fuels are part of a broader category. For example, the patent language: "If at least 50% of the fuel sold . . . were a composition of the invention, it is believed . . . that reductions in auto emissions . . . as high as 20% *as compared to the typical gasoline fuel* could be observed" simply shows that the patented fuels improve upon traditional fuels. Col. 16:9-15 (emphasis added). Similarly, patent specifications for the new fuel that differ from those of typical gasoline fuels, including differences in the normal amounts of olefins and paraffins, and properties normally associated with specialty gasolines rather than automobile gasolines, further indicate the changes that the '393 patent brings to the art. References to gasolines meeting the industry standards for automotive gasoline as the "most preferred embodiments" of the invention do not constitute a limitation on the claim. *Laitram Corp. v. Cambridge Wire Cloth Co.*, 863 F.2d 855, 865 (Fed. Cir. 1988), *cert. denied*, 490 U.S. 1068 (1989).

The patent presents the invented fuel as an automotive fuel, with characteristics unique to such fuels:

> In view of the foregoing, it can be seen that the invention offers many advantages, not the least of which are the obvious health benefits associated with reduced air pollutants emitted to the atmosphere from automobiles, trucks, and other gasoline powered motor vehicles. Additionally, the invention can be put into immediate practice; current refining equipment can be employed to produce the low polluting fuels of the invention. Moreover, the invention offers the petroleum refiner a great deal of flexibility, for the invention is highly adaptable to a wide variety of hydrocarbon refinery streams. More specifically, since the description hereinbefore shows the effect of different variables, the refiner is not constrained to producing one particular fuel, but has several options, depending on what hydrocarbon streams are at hand and what properties of the fuel can be most easily altered.

Col. 17:40-56. These characteristics of refinery mass-production, blending of components, and adaptability of composition are characteristic of automotive gasolines for general use, and not of specialty gasolines.

The preamble, "[a]n unleaded gasoline fuel, suitable for combustion in an automotive engine," similarly supports this interpretation. Language in a claim preamble may be interpreted, on the facts of each case, to be either a statement of use or purpose for the invention, as Plaintiffs argue here, or as an actual limitation on the scope of the claim, as Defendants argue. On the facts of this case, Defendants' interpretation is correct.

This case is controlled by the analysis set forth in *Corning Glass Works v. Sumitomo Electric U.S.A., Inc.*, 868

F.2d 1251 (Fed. Cir. 1989). There, the Federal Circuit found that the preamble language was a limitation because it revealed the particular problem that the inventors sought to resolve, and was therefore necessary to give meaning to the rest of the claim:

> The effect preamble language should be given can be resolved only on review of the entirety of the patent to gain an understanding of *what the inventors actually invented and intended to encompass by the claim.* Here, the '915 specification makes clear that the inventors were working on the particular problem of an effective optical communication system[,] not on general improvements in conventional optical fibers. *To read the claim in light of the specification indiscriminately to cover all types of optical fibers would be divorced from reality.*

Corning Glass Works, 868 F.2d at 1257 (emphasis added); *see also Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995) (stating the "well-settled" general principle of patent law that "a claim preamble has the import that the claim as a whole suggests for it. In other words, when the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects."); *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994) (stating strongly that the preamble may be considered in the claim construction process when it relates to the intent of the inventor: "Although no 'litmus test' exists as to what effect should be accorded to words contained in a preamble, review of a patent in its entirety should be made to determine whether the inventors intended such language to represent an additional structural limitation or mere introductory language."); *Marston v. J. C. Penney Co.*, 353 F.2d 976, 986

(4th Cir. 1965) (preamble not a limitation when it merely states a purpose or intended use and the rest of the claim fully defines the invention; if preamble is necessary to give the claim meaning or is "essential to point out the invention," it is a limitation.), *cert. denied*, 385 U.S. 974 (1966).

More recently, the Federal Circuit similarly affirmed the district court's interpretation of language in the preamble as constituting a limitation on the claims. *Applied Materials, Inc. v. Advanced Semiconductor Materials*, 40 U.S.P.Q.2d 1481, 1487-88 (Fed. Cir. 1996). The Court noted that the purpose and context of the invention were clear from the specifications, and that the term "cold purge" in the preamble must be "interpreted in light of the problem the . . . patent solved." *Applied Materials*, 40 U.S.P.Q.2d at 1488. It also approved the district court's construction of the preamble language as setting a context in which to read the specification: "This context requires construing the literal meaning of the claims as limited to the process wherein electrostatic contamination is formed and removed." *Id.* at 1488.

As with the patents in *Applied Materials* and *Corning Glass Works*, the '393 patent's references to automobile emissions and the problem the invention is intended to solve stamp an indisputably clear meaning and context onto the patent, distinct from the broader context Plaintiffs would suggest. Although it is true that "suitable for combustion in an automotive engine" can be stretched to include any fuel that *could be burned*, this construction is nonsensical in light of the patent's clear intent to reduce auto emissions: there is no meaningful interpretation other than a limit to fuels that will *regularly* be used in autos, not that conceivably could be. The specification language leaves no doubt that the invention is to reduce the overall level of noxious emissions from automobiles, which implies, as well as necessitates, regular use by large numbers of the motoring public.

Plaintiffs rely upon *Constant v. Advances Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir.), *cert. denied*, 488 U.S. 892 (1988). There, the court held that the limitations the inventor claimed were essential to the patent were not limitations, but merely described an embodiment of the invention. The *Constant* court noted that the inventor had neither defined terms in the patent in a way that supported his assertions, nor implicitly suggested such an interpretation in the text. However, the '393 patent, unlike the patent in *Constant*, clearly suggests in the text that the fuels are for automobile use. Further, Defendants' '393 patent, unlike the patent in *Constant*, does not contain language to the effect that the fuel "may be any one of a number of types, the exact type to be determined by the application." *Constant*, 848 F.2d at 1571. The court cited many cases for the proposition that "[a]lthough the specification may aid the court in interpreting the meaning of disputed language in the claims, particular embodiments and examples appearing in the specification will not generally be read into the claims." *Id.* However, again *Constant* is readily distinguishable, because in *Constant* "[a] reading of the specification *provides no evidence* to indicate that these limitations must be imported into the claims to give meaning to the disputed terms." *Id.* at 1571.

The language of the patent is unambiguous. Plaintiffs' interpretation is a tortured attempt to expand the scope of the patent by seizing on trivialities that, considered in context, do nothing to alter the patent's plain import. The patent is intended to encompass only traditional automotive fuels. To paraphrase *Corning Glass Works*, "to read the claim in light of the specification indiscriminately to cover all types of fuels that could be burned in an automotive engine would be divorced from reality."

2. Prosecution History

The Court should also evaluate the patent's prosecution history, if in evidence. "[T]he record before the Patent and Trademark Office is often of critical significance in determining the meaning of the claims." *Vitronics*, 90 F.3d at 1582; *see also Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995), *aff'd*, 116 S. Ct. 1384 (1996). An examination of the prosecution history and the references contained therein may assist the court in interpreting the language in the patent, and the patentee's "avowed understanding . . . when his application . . . was pending" may confirm the construction. *Markman*, 52 F.3d at 980 (quoting *Goodyear Dental Vulcanite Co. v. Davis*, 102 U.S. 222, 227 (1880)).

The prosecution history of the '393 patent confirms the Court's construction of its express language. Defendants' Appendices Vols. 3, 4. The prior art and other references contained in the disclosure statements overwhelmingly concern automotive gasoline compositions or gasoline emission studies. *See, e.g.*, Disclosure Statement Nos. 1, 2, 3, 8, 10. In Disclosure Statement No. 7, a number of potentially relevant references are brought to the attention of the patent examiner, but to the extent that any of these claim gasolines not generally considered for automobile use, their significance is expressly disclaimed:

> [W]hen applicants state, as they do above, that the references do not remotely suggest the invention, this is truly believed to be the case. The references individually and in combination do not suggest the environmental advantages applicants discovered with respect to the compositions' claims, i.e., their usefulness in producing lower amounts of pollutants from gasoline combusted in an automotive engine.

Although the prosecution history contains occasional mentions of non-automotive gasolines, in particular the racing fuels, aviation fuels, and alkylates on which Plaintiffs fixate, it is clear that the inventors intended and represented that the invention was for regular use in automobiles, designed to reduce air pollutant emissions. No other reasonable interpretation could be given to these materials.

III. Lack of Novelty

Having construed the patent, the Court must next determine whether the patented invention is novel, or merely a new use for a previously existing composition. The requirement of novelty lies at the heart of patentability:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor . . . .

35 U.S.C. § 101. The Court finds that a genuine issue of material fact exists as to whether the claims, as herein construed, are novel.

The Federal Circuit, in a trilogy of cases, has explored the requirements to establish a composition as novel. In *Titanium Metals Corp. of Am. v. Banner*, 778 F.2d 775 (Fed. Cir. 1985), the inventor sought to patent an alloy composition previously disclosed in a Russian article but defined in the invention by new properties. The court noted that the invention "discovered or invented and disclosed knowledge which is not to be found in the reference," *Titanium Metals*, 778 F.2d at 780, but recognized that the newness of the invention was a separate inquiry. *Id.* The court rejected the argument that the application disclosed certain previously unknown inherent properties of the alloys, because the alloys themselves had been previously known. *Id.* at 782. Significantly, in *Titanium Metals*, the inventor did not claim

that the invention was compositionally new, but rather that the disclosure of new properties made it separately patentable.

E.I. DuPont de Nemours & Co. v. Phillips Petroleum Co., 849 F.2d 1430 (Fed. Cir. 1988), involved a patent for two groups of copolymers. The patentees conceded that one group was disclosed by prior art. *DuPont*, 849 F.2d at 1434. The other claims, however, included specific property limitations that were not part of the prior art. The court rejected the challenger's argument that, under *Titanium Metals*, these limitations were "merely property limitations that cannot serve to distinguish the claims." *Id.* at 1435. The court instead recognized that where a composition is produced from the same components but by a different process, the specification of additional properties may assist in defining and describing the new composition:

> It is clear, therefore, that the district court correctly regarded the claimed interpolymers as compositions that can be permissibly defined in terms of structure and properties. Thus, the issue is not, as in *Titanium*, whether one can get a patent on discovering a new property of an old composition of matter. The issue is whether the claimed copolymer, as defined in part by various property parameters, is new. In *Titanium*, once the alloy disclosed in the prior art reference was determined to possess the structural limitations of the claim, the burden shifted to the applicants to show that the alloy disclosed in the reference did not possess the claimed property. Here, however, Phillips has not shown that their interpolymers of ethelyne and higher alpha olefins possess the property limitations set forth in the claims.

Id. at 1435-36.

The last of the trilogy is *In re Spada,* 911 F.2d 705 (Fed. Cir. 1990). *Spada* concerned an adhesive composition. The patent application was rejected for lack of novelty, based on a prior art reference made with a "virtual identity of monomers and procedures"; Spada had merely disclosed a new use. *Spada*, 911 F.2d at 708. "The discovery of a new property or use of a previously known composition, even when that property and use are unobvious from prior art, can not impart patentability to claims to the known composition." *Id.* Spada did not show, as the court required, that the composition itself was different to meet the requirements of *DuPont.*

Given this legal analysis and the construction of the '393 patent as limited to typical automotive fuels, Plaintiffs have not met their burden on a motion for summary judgment of demonstrating that no issue of material fact exists. Plaintiffs argued for a construction of the patent that was broad enough to encompass certain specialty fuels. However, as the Court has rejected the broad construction and limited the patent to traditional automotive fuels, a question remains as to whether the specialty fuels are prior art under the Court's construction. It remains disputed whether the patent merely reveals new properties of a previous invention, as in *Titanium Metals* and *Spada*, or whether it teaches a new process defined by the properties of the resulting composition, as in *DuPont.* Therefore, the motion as to invalidity of the patent for lack of novelty must be denied.

IV. Conclusion

Accordingly, the Court finds, as a matter of law, that the intrinsic evidence regarding the '393 patent leaves no ambiguity as to the meaning of the patent and grants Plaintiffs' motion for claim construction, finding it would be erroneous to resort to extrinsic evidence to construe the patent. The '393 patent is construed in accordance with its

plain meaning: It teaches unleaded gasoline fuels intended for regular use in automobiles, *i.e.*, traditional motor gasoline to be mass-produced at typical refineries for the general motoring public.

Plaintiffs' motion for summary judgment of invalidity is denied as a genuine factual dispute exists as to the novelty of the invention.

IT IS SO ORDERED.

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

UNION OIL COMPANY OF CALIFORNIA,

Plaintiff,

v.

ATLANTIC RICHFIELD COMPANY,
CHEVRON U.S.A., INC.
EXXON CORPORATION,
MOBIL OIL CORPORATION,
SHELL OIL PRODUCTS COMPANY and
TEXACO REFINING AND MARKETING, INC.,

Defendants,

No. CV-95-2379-KMW

March 10, 1998

ORDER DENYING DEFENDANTS' MOTION FOR JUDGMENT AS A MATTE R OF LAW

Before WARDLAW, District Judge.

The Court has read and considered all of the papers filed by the parties in connection with Defendants' Motion for Judgment as a Matter of Law ("JMOL"). Pursuant to Local Rule 7.11, the Court has dispensed with oral argument as it deems it unnecessary and not otherwise required by the rules governing this motion. Based on all briefs, exhibits, declarations, and other evidence submitted by the parties, as well as all files and records in this case, the Court is prepared

to rule on this motion and hereby **DENIES** Defendants' motion for judgment as a matter of law.

I. Legal Standard

The Defendants have timely moved for a renewed judgment as a matter of law pursuant to Federal Rule of Civil Procedure 50(b), having previously moved for a judgment as a matter of law pursuant to Fed. R. Civ. P. 50(a).[1] A Rule 50(b) judgment as a matter of law is proper when the evidence allows only one reasonable conclusion as to the verdict. *Venegas v. Wagner*, 831 F.2d 1514, 1517 (9th Cir. 1987). The evidence must be viewed in the light most favorable to the nonmoving party, and all reasonable inferences must be drawn in favor of that party. *Id.* A JMOL is improper if reasonable minds could differ over the verdict. *Id.* In assessing the motion, the trial judge is not vested with the power to weigh evidence and must, issue a ruling of law. 9 James Wm. Moore, *Moore's Federal Practice* § 50.03 (3d ed. 1997); *see also Wilson v. United States*, 645 F.2d 728, 729 (9th Cir. 1981) ("The trial judge does not act as factfinder."). A patent holder's claims are entitled to the presumption of validity, and it is defendant's burden to show, by clear and convincing evidence, their invalidity. *Gillette Co. v. S.C. Johnson & Son, Inc.*, 9 19 F.2d 720, 723 (Fed. Cir. 1990).

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[1] The standard of review of a judgment as a matter of law is the same whether the motion is submitted pre-verdict or post-verdict. *Moore's Federal Practice* at § 50.02[2].

II. Analysis

Defendants assert several claims in support of their JMOL. Regarding each, Defendants set forth "evidence of record which would be sufficient to lead any reasonable jury" to find for Defendants. *See* JMOL at 1.25 n.1. As a general matter, this Court is hesitant to disturb the findings of fact rendered by the jury from the evidence. The liability phase of the trial lasted 49 court days, the Court received hundreds of exhibits into evidence, and the jury deliberated for 13 days and unanimously answered 222 questions on the Special Verdict form. It is the Court's opinion that the jury carefully weighed the evidence, and that its findings of fact are entitled to substantial consideration.

A. Invention Date

Defendants first argue that Unocal failed to establish for any '393 patent claim an "invention" date prior to the patent application filing date. JMOL at 1:1-23. They claim that Unocal's "conception evidence" is inadequate to support the verdict because it did not disclose the combination of property ranges required by any undisclaimed claim, the evidence failed to satisfy the legal requirement of independent corroboration, and that a jury could not have concluded that the 15P2 fuel constituted a reduction to practice. The invention date was the subject of testimony by inventors Drs. Jessup and Croudace, and of an affidavit by Mr. Steve Woods introduced as independent corroboration evidence. Plaintiff introduced contemporaneous computer records which supported the March 30, 1990 invention date. Defendants' argument amounts to no more than a challenge to the sufficiency of the evidence and the jury's conclusions from the same. Because the Court finds that reasonable people could disagree over the conclusion to be drawn from the evidence, it declines to overturn the findings of the jury with respect to this issue.

B. Novelty

Defendants' second claim is that the '393 patent is invalid for lack of novelty. The defense of lack of novelty "can only be established by a single prior art reference which discloses each and every element of the claimed invention." *Structural Rubber Products Co. v. Park Rubber Co.*, 749 F.2d 707, 715 (Fed. Cir. 1984); *Scripps Clinic & Research Found. v. Genetech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991) ("Invalidity for anticipation requires that all of the elements and limitations of the claims are found within a single prior art reference.").

Defendants argue that prior art gasolines introduced into evidence satisfy the Court's claim construction of "traditional motor gasolines to be mass-produced at typical refineries for the general motoring public," JMOL at 2:7-8, and that all of the prior art gasolines anticipate one or more '393 patent claims." *Id.* at 2:8-16. Defendants point to numerous transcript references detailing various fuels which satisfy certain property limitations of several claims. JMOL at 4-7. Here, the jury had the task of considering whether the identified fuels constituted invalidating prior art, and found that they did not. The Court finds that the evidence was sufficient to show that no single prior art reference disclosed each and every element of the claimed invention, and as a result, does not find the patent invalid on this ground.

C. Obviousness

Obviousness is a legal determination that may be submitted to the jury with proper instructions. *In re Hayes Microcomputer Products Patent Lit.*, 982 F.2d 1527, 1539 (Fed. Cir. 1992). Though obviousness is a question of law, it is based on "underlying factual inquiries which are issues for the trier of fact." *Modine Mfg. Co. v. Allen Group, Inc.*, 917 F.2d 538, 541 (Fed. Cir. 1990) (citations omitted). These factual issues are: (1) the scope and content of the prior art, (2) the differences between the most pertinent prior art and

the claimed invention, (3) the level of ordinary skill in the art, and (4) the objective evidence of secondary considerations of obviousness." *Id.* Though the ultimate question of obviousness is an issue regarding which the court must make an independent decision, the court may not make its own factual findings on this issue independent from the jury. *Newell Companies, Inc. v. Kenney Mfg. Co.*, 864 F.2d 757, 765 (Fed. Cir. 1988). A jury's resolution of evidentiary conflicts to establish the facts is the essence of its role in the trial: "Judges must accept the factual findings, presumed from a favorable jury verdict, which are supported under the substantial evidence/reasonable juror standard." *Id.*

Defendants assert that any reasonable jury would have found the '393 patent invalid in view of the prior art. JMOL at 17:15-15. They assert that several prior art gasolines existed which had properties "that differed in only trivial respects from the claims of the '393 patent." JMOL at 8:5-9. The Court's claim construction identified traditional motor fuels for the general motoring public specifically to distinguish these fuels from specialized fuels such as racing and aviation fuels. Much testimony focused on the differences between these two categories of fuels. To the extent that Defendants wish this Court to find that aviation and racing fuels constitute prior art for the '393 patent, it is asking the Court to reconsider its original claim construction, which would more appropriately have been requested in a motion to reconsider the claim construction or which Defendants should present on appeal. To the extent that Defendants ask the Court to find that these fuels constituted prior art to the '393 patent, they ask this Court to disagree with the findings of fact as rendered by the jury on a matter that was appropriately for it to decide. Extensive testimony was presented by Drs. Jessup and Croudace, Mr. Cunningham and Mr. Miller regarding the nature of the compositional differences among categories of fuels. The weight and credibility of their testimony as it bore on what

constituted prior art is a determination upon which, in this Court's opinion, reasonable jurors could have disagreed. Additionally, with respect to individual specifications and properties of claimed prior art references and the differences between these references and the patent, as stated above, the Court respects the factual findings of the jury rendered from the evidence in the record. In accepting the findings of fact regarding prior art rendered by the jury, the Court holds that the findings of fact are sufficient to establish the legal conclusion that the patent was not invalid for obviousness.

D. Written Description Requirement of 35 U.S.C. § 112

Patent code 35 U.S.C. § 112 requires:

> "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor carrying out his invention."

The standard for determining whether the written description requirement has been met has been described by the Federal Circuit:

> Although [the applicant] does not have to describe exactly the subject matter claimed, . . . the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed. . . . The test for sufficiency of support in a parent [sic] application is whether the disclosure of the application relied upon reasonably conveys to

> the artisan that the inventor had possession at that time of the later claimed subject matter.

In re Hays Microcomputer, 982 F.2d 1527, 1533 (Fed. Cir. 1992), citing *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991). Whether the written descriptions have been met is a question of fact, reviewed by the court under the substantial evidence standard, and requiring affirmance unless Defendants show that no reasonable juror could have reached such a result. *In re Hays Microcomputer*, 982 F.2d at 1532-33. The court is to determine whether substantial evidence exists in the record to support the verdict. *Id.* at 1533.

Defendants argue that none of the combinations of property ranges set forth in any disclaimed claim appears in the specification as it was originally filed, and that as a result, the claims are invalid for lack of a supporting written description. JMOL at 19:12-14, 19:22-24. However, whether a patent is invalid for lack of a written description turns not on whether the specifications as filed set forth each and every facet or descriptor of the invention, but whether the written description is sufficient to be satisfied that the claimed inventor did in fact invent the patented work. *See In re Hays, supra.* In this case, the Court finds that substantial evidence exists in the record regarding the written description to support the verdict that Drs. Jessup and Croudace had possession of the claimed subject matter, and therefore does not find the patent invalid for lack of a written description.

Defendants' second argument that the claims as construed by the Court are invalid, JMOL at 20:21-22, is an attack on the Court's claim construction. Additionally, Defendant's next claim that the patent is invalid because it fails to distinctly claim the subject matter of the invention, JMOL at 22:16-22, is similarly a challenge to the Court's claim construction, and is therefore insufficient to support a finding that the patent is invalid.

E. Enablement

Section 112 of the 35 U.S.C. requires the specification be "enabling" only to a person "skilled in the art to which it pertains, or with which it is most nearly connected." Donald S. Chisum, *Chisum on Patents* at 3:7.03[2] (1997), citing *DeGeorge v. Bernier*, 768 F.2d 1318 (Fed. Cir. 1985). Invalidity for lack of enablement "is a conclusion of law and must be supported by facts proved by clear and convincing evidence, for the grant of the patent by the PTO carries with it the presumption of validity including compliance with § 112." *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 941 (Fed. Cir. 1990), *cert. denied*, 498 U.S. 920 (1990).

Defendants argue that the patent is invalid for lack of enablement because the claims, as construed by the Court, were defined in such a way that they were limited to "traditional motor gasolines" and as such render the specification non-enabling. JMOL at 23:15-24:8. Again, this argument is no more than a dispute with the Court's claim construction, and is insufficient to establish nonenablement. That standard requires that such a person be able to recreate the claimed invention based on the disclosures set forth in the patent; it does not require that the invention actually be made and marketed by a person skilled in the art. The Court finds that the evidence was sufficient to show that the patent was enabling to a person of ordinary skill in the art, and is not invalid on this ground.

F. Infringement

Literal infringement may be found when the accused invention falls within the asserted claims as properly construed. *In re Hayes Microcomputer Products Patent Lit.*, 982 F.2d 1527, 1541 (Fed. Cir. 1992). The patentee has the burden of proving infringement by a preponderance of the evidence. *Id.* The determination of literal infringement is a question of fact. *Id.*

As a question of fact, the jury determined that Defendants' gasoline did infringe the '393 patent. This Court does not find any reason to overturn the jury's factual finding on this issue, and cannot issue a contrary ruling of law.

In this case, the Court finds that reasonable fact-finders evaluating the evidence could have found that the patent was valid and infringed as set forth above, and hereby **DENIES** Defendants' motion for judgment as a matter of law.

IT IS SO ORDERED.

UNITED STATES COURT OF APPEALS,
FEDERAL CIRCUIT

UNION OIL COMPANY OF CALIFORNIA,
Plaintiff-Appellee,
v.
ATLANTIC RICHFIELD COMPANY, *et al.*,
Defendants-Appellants.
No. 99-1066

May 18, 2000

Before MAYER, Chief Judge, LOURIE and RADER, Circuit Judges.

ORDER

A combined petition for panel rehearing and rehearing en banc having been filed by the APPELLANTS, and the petition for rehearing having been referred to the panel that heard the appeal, and thereafter the petition for rehearing en banc having been referred to the circuit judges who are in regular active service,

Upon consideration thereof, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED and it is further

ORDERED that the petition for rehearing en banc be, and the same hereby is, DENIED.

The mandate of the court will issue on May 25, 2000.

Circuit Judge SCHALL did not participate in the vote.

THE ORIGINAL 60 COMPOSITION CLAIMS OF THE '393 PATENT

Claim	RVP (psi)	T10 (° F)	T50 (° F)	T90 (° F)	Olefins (Vol. %)	Paraffins (Vol. %)	Aromatics (Vol. %)	Octane Rating
1	≤ 8.0		≤ 215					
2	≤ 8.0		≤ 215		< 10			
3	≤ 8.0		≤ 205		< 10			
4	≤ 8.0	≤ 140	≤ 205		< 10			
5	≤ 8.0		≤ 205		< 10	≥ 65		
6	≤ 8.0		< 200		< 10			
7	≤ 8.0		< 195		< 10			
8	≤ 8.0		< 195		<10	> 75		
9	≤ 8.0		< 195		< 5			
10	≤ 8.0		< 190		< 5			
11	≤ 8.0		< 190		< 2			
12	≤ 8.0		< 185		< 2			
13	≤ 8.0		< 185		< 1			
14	≤ 8.0		< 185		< 0.5			
15	≤ 8.0		> 180, < 185		< 0.5			
16	≤ 8.0		> 180, < 185		< 0.5	≥ 90		

THE ORIGINAL 60 COMPOSITION CLAIMS OF THE '393 PATENT

Claim	RVP (psi)	T10 (° F)	T50 (° F)	T90 (° F)	Olefins (Vol. %)	Paraffins (Vol. %)	Aromatics (Vol. %)	Octane Rating
17	≤ 8.0		> 180, < 185		0			
18	≤ 8.0	≤ 135	> 180, < 185	≤ 315	0			RON ≥ 90
19	≤ 8.0		> 180, ≤ 205		< 5			
20	≤ 8.0		> 180, ≤ 205		< 0.5			
21	≤ 8.0		> 180, ≤ 205		0			
22	≤ 7.5		> 180, ≤ 205		0			
23	≤ 7.5		> 180, ≤ 205		< 0.5			
24	≤ 7.0		> 180, ≤ 205		0			
25	≤ 7.0		> 180, ≤ 205		< 0.5			
26	≤ 7.5	≤ 135	> 180, ≤ 205	≤ 315	0			RON ≥ 90
27	≤ 7.5	≤ 135	> 180, ≤ 205	≤ 315	0		≥ 35	RON ≥ 90
28	≤ 7.5	≤ 120	> 180, < 200	≤ 315	0	≥ 85		RON ≥ 90
29	≤ 7.5	≤ 120	> 180, < 200	≤ 300	0	≥ 85	No MTBE	RON ≥ 90
30	≤ 8.0		≤ 215		< 5			
31	≤ 8.0		≤ 215		< 2			
32	≤ 8.0		≤ 215		< 0.5			

THE ORIGINAL 60 COMPOSITION CLAIMS OF THE '393 PATENT

Claim	RVP (psi)	T10 (° F)	T50 (° F)	T90 (° F)	Olefins (Vol. %)	Paraffins (Vol. %)	Aromatics (Vol. %)	Octane Rating
33	≤ 8.0		≤ 205					
34	≤ 8.0		≤ 200					
35	≤ 8.0		≤ 195					
36	≤ 8.0		≤ 190					
37	≤ 7.5		≤ 215					
38	≤ 7.0		≤ 215					
39	≤ 8.0		< 208					
40	≤ 8.0		≤ 206		< 1			
41			≤ 205		< 3			
42			> 180, ≤ 205		< 3			
43	≤ 8.0		> 180, ≤ 200		< 1			
44			> 180, ≤ 195		< 3			
45	≤ 8.0					≥ 40		
46	≤ 8.0					> 50		
47	≤ 8.0					> 65		
48	≤ 8.0				< 15	≥ 40		

THE ORIGINAL 60 COMPOSITION CLAIMS OF THE '393 PATENT

Claim	RVP (psi)	T10 (° F)	T50 (° F)	T90 (° F)	Olefins (Vol. %)	Paraffins (Vol. %)	Aromatics (Vol. %)	Octane Rating
49	≤ 8.0				< 1	≥ 40		
50	≤ 7.5				< 1	≥ 40		
51	≤ 7.5				0	≥ 40		
52	≤ 7.0				< 1	≥ 40		
53	≤ 7.5				< 1	≥ 75		
54	≤ 7.5				< 15		No MTBE	
55	≤ 7.5				< 10		No MTBE	
56	≤ 7.5				< 5		No MTBE	
57	≤ 7.5				< 2		No MTBE	
58	≤ 7.5				0		No MTBE	
81	≤ 8.0		≤ 215				*	
82	≤ 8.0		≤ 215				**	

* To red. emis. by 20% comp. to A/O AVE

** To red. emis. by 10% comp. to A/O AVE

THE 41 UNDISCLAIMED CLAIMS OF THE '393 PATENT

Claim Number	Properties Claimed						
	RVP psi	T10 °F	T50 °F	T90 °F	Olefins Vol. %	Paraffins Vol. %	Octane (R+M)/2
20	< 7.5		> 180 ≤ 203		< 0.5	> 75	
53	≤ 7.0				< 10	> 85	≥ 87
54	≤ 7.0				< 10	> 85	≥ 92
56	≤ 7.0				< 10	> 80	≥ 92
57	≤ 7.0				< 10	> 77	≥ 92
71	≤ 7.0		≤ 205		< 10		≥ 92
72	≤ 7.0		≤ 200		< 10		≥ 92
73	≤ 7.0		≤ 200		< 6		≥ 92
74	≤ 7.0		≤ 200	≤ 300	< 6		≥ 92
75	≤ 7.0		≤ 200		< 4		≥ 92
78	≤ 7.0		≤ 210		< 6		≥ 92
79	≤ 7.0		≤ 210		< 4		≥ 92
81	≤ 7.0		≤ 200	≤ 300			≥ 92

THE 41 UNDISCLAIMED CLAIMS OF THE '393 PATENT

Claim Number	Properties Claimed						
	RVP psi	T10 °F	T50 °F	T90 °F	Olefins Vol. %	Paraffins Vol. %	Octane (R+M)/2
112	≤ 7.0		≤ 210		< 10	> 75	
113	≤ 7.0		≤ 210		< 4	> 75	
114	≤ 7.0		≤ 210		< 4	> 85	
115	≤ 7.0		≤ 200		< 4	> 75	
116	≤ 7.0		≤ 200	≤ 300	< 4	> 85	
117 (53)	≤ 7.0	≤ 158			< 10	> 85	≥ 87
117 (73)	≤ 7.0	≤ 158	≤ 200		< 6		≥ 92
117 (78)	≤ 7.0	≤ 158	≤ 210		< 6		≥ 92
117 (112)	≤ 7.0	≤ 158	≤ 210		< 10	> 75	
117 (116)	≤ 7.0	≤ 158	≤ 200	≤ 300	< 4	> 85	
117 (125)	≤ 7.0	≤ 158	≤ 205		< 6	> 75	
120 (55)	≤ 6.8	≤ 158			< 10	> 80	≥ 87
120 (78)	≤ 6.8	≤ 158	≤ 210		< 6		≥ 92
120 (79)	≤ 6.8	≤ 158	≤ 210		< 4		≥ 92
120 (124)	≤ 6.8	≤ 158	≤ 205		< 6	> 75	

THE 41 UNDISCLAIMED CLAIMS OF THE '393 PATENT

Claim Number	Properties Claimed						
	RVP psi	T10 °F	T50 °F	T90 °F	Olefins Vol. %	Paraffins Vol. %	Octane (R+M)/2
121 (55)	≤ 6.5	≤ 158			< 10	> 80	≥ 87
121 (78)	≤ 6.5	≤ 158	≤ 210		< 6		≥ 92
121 (79)	≤ 6.5	≤ 158	≤ 210		< 4		≥ 92
121 (124)	≤ 6.5	≤ 158	≤ 205		< 6	> 75	
125	≤ 7.0		≤ 205		< 6	> 75	
126	≤ 7.0		≤ 200		< 6	> 75	
127	≤ 7.0		≤ 200	≤ 315	< 6	> 75	
133	≤ 7.0		≤ 205			> 85	
134	≤ 7.0		≤ 200			> 85	
135	≤ 7.0		≤ 210			> 85	
137	≤ 7.0		≤ 200			> 75	
153	< 7.0	≤ 158				> 80	≥ 87
155	≤ 6.8	≤ 158				> 82	≥ 87

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